INSTITUTE OF TEXTILE TECHNOLOGY
CHARLOTTESVILLE, VIRGINIA

AMERICAN DYESTUFF REPORTER

VOLUME 47

1958

D

Volume

Histo

T

THIS
too
in the
story o
the for
hero is
Menonv
and Bo
Does st
trigue b
devoted
Yes, fo
volve t
from a
of colo
the the
the livi
and the
Mexico
bery w
cial los
been t
laden v
we who
less pro
within
office o
joy for
one of
velopm
Thier
try we
patriots
after hi
de Me
Francai
1785, fi
speaker
"Ol
furnis
whose
aston
ginni
thoug
usefu
famou
and l
tion o
"He
conse

AMERICAN

DYESTUFF REPORTER

Volume 47 January 13, 1958 Number 1

Historical Notes (No. 14)—

—SPANISH RED—
THIERY DE MENONVILLE'S VOYAGE A GUAXACA

SIDNEY M EDELSTEIN
Dexter Chemical Corporation
New York, N Y

This is the fourteenth in a series of historical articles which the textile chemist and colorist will find of interest.

The author, a prominent science historian, is the founder of an outstanding collection of great works, documents and letters in the history of chemistry and related sciences.

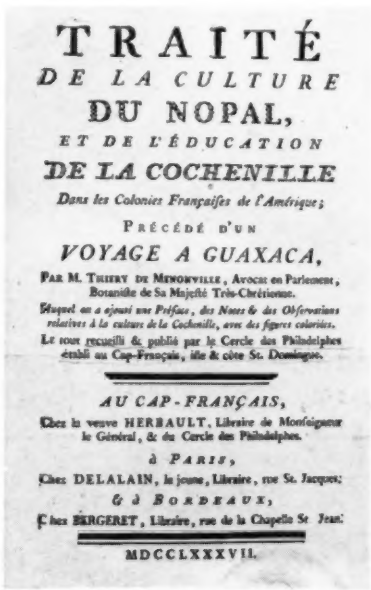
Articles and illustrations in this series are from the author's library.

THIS is an adventure story which took place on the Spanish Main in the 18th century. This is also the story of an impossible journey into the forbidden land of Mexico. Our hero is Nicolas Joseph Thiery de Menonville, Avocat de Parliament, and Botanist to the King of France. Does such a tale of piracy and intrigue belong in the pages of a journal devoted to dyeing and color science? Yes, for Thiery's exploits did not involve the piracy of gold or spices from a Spanish galleon, but the piracy of color "know how." This involved the theft of living cochineal insects, the living plants upon which they fed and their transportation from Spanish Mexico to French Haiti. Thiery's robbery was potentially a greater financial loss to Spain than would have been the destruction of ten ships laden with silver and gold. Certainly we who are engaged in the more or less prosaic pursuit of our profession within the confines of a laboratory, office or dyehouse, are entitled to enjoy for a moment the adventures of one of us who did research and development work in a story book way.

Thiery's contributions to his country were recognized by his compatriots, but as usually happens, only after his death. In a eulogy of Thiery de Menonville, delivered at Cap Francais on the 9th of September, 1785, five years after his death, the speaker proclaimed (*1*):—

"Oh my country! After having furnished heroes and legislators whose valor and astuteness have astonished Europe you are now beginning to produce men who even though less famous are no less useful. Their exploits may not be famous but their useful discoveries and labors will merit the recognition of posterity.

"How happy I would be if I could consecrate my existence to the service of my compatriots! If I had been able to make use of my feeble talents and to present my work as a tribute to the temple which my country has raised to science, to literature and to the arts! But it is a consolation for me in a distant land and under a brilliant sun where one cultivates sciences only at the peril of his life to there render homage to a man of Lorraine (Thiery de Menonville)! How my heart is satisfied in being able, without outraging truth to place him among the benefactors of the colony who have always been passionate to accomplish the best and are only concerned with trying to find the means of improving the riches of the nation with their industry."



TRAITÉ
DE LA CULTURE
DU NOPAL,
ET DE L'ÉDUCATION
DE LA COCHENILLE
Dans les Colonies Françaises de l'Amérique;
PRÉCÉDÉ D'UN
VOYAGE A GUAXACA,
PAR M. THIERY DE MENONVILLE, Avocat en Parlement, Botaniste de Sa Majesté Très-Chrétienne.
Auquel on a ajouté une Préface, des Notes & des Observations relatives à la culture de la Cochenille, avec des figures coloriées.
Le tout recueilli & publié par le Cercle des Philadelphes établi au Cap-Français, isle & côte St. Domingue.
AU CAP-FRANÇAIS,
Chez la veuve HERBAULT, Libraire de Monseigneur le Général, & du Cercle des Philadelphes.
& PARIS,
Chez DELALAIN, le jeune, Libraire, rue St. Jacques;
& à BORDEAUX,
Chez BERGERET, Libraire, rue de la Chapelle St Jean.
MDCCLXXXVII.

Figure 1
Title page of rare publication containing Theiry's diary

Thiery was born at Saint Mihiel in Lorraine, France, near the middle of the 18th century. He came from a family of lawyers and ecclesiastics and, following the family tradition, he studied law. But Thiery, in spite of his family, wanting to become a naturalist, managed to get to Paris and studied under the great Jussieu.

Thiery felt that the studies of a botanist only had meaning if they helped his country to bring forth a new remedy or a useful commodity. Reading some of the writings of the famous Abbe Raynal, Thiery was stirred and excited by the former's insistence that nations should make use of the riches of their colonies and should take every step to expand their industries. He was particularly struck by Raynal's mention of cochineal (*2*):—

"Cochineal whose price is always high should excite the interest of nations which cultivate the American islands and other people which inhabit regions where the temperature would be suitable for this insect and the plant on which it is nourished. In the meantime New Spain remains in complete possession of this rich industry."

Thiery now had a "cause." He could put his botanical skill to work for his country. He would go to Mexico, study the culture of cochineal and bring the insect and the nopal on which it grew to French Haiti, which climatically should be

Figure 2
Thiery's Route from Port au Prince to "Guaxaca" and return

particularly suitable. The poor inhabitants would now have gainful employment and France would benefit. The Gobelins and other dyehouses of France would now dye "French" reds instead of paying tribute to Spain.

Thiery was able to persuade the Minister and the French government of the value of his project and with their blessings and encouragement he set sail for Haiti in the year 1776.

The beginnings of Thiery's project are best told in his own words (*3*):—

"After communicating to the minister of His Majesty at the head of the naval department the plan requisite for insuring its success, I had laid of naturalizing the nopal and cochineal insect in the French colonies, and receiving with his approbation of my design the means requisite for insuring its success, I made all diligence to put this plan in practice.

"In this view I embarked for Port-au-Prince, and arrived there after a passage, equally tedious and fatiguing, of sixty-six days. Tired and disgusted with the sea I determined on enjoying ease for the space of a month or two on shore, a relaxation for which length of time appeared to me necessary towards my becoming acquainted with the mode to be adopted for penetrating into the interior of the Spanish territory bordering on that belonging to France, whence I expected to find a more ready conveyance to Vera Cruz, or to Honduras. Already had I formed schemes for proceeding to Santo Domingo, or, at any rate, for seeking at the Cape an opportunity of reaching Havannah by the vessels of the Assiento company, which pass between that place and the Cape in the traffic for slaves; but I could not disguise from myself that either of these two plans was attended with inconvenience.

"I was still wavering in opinion respecting the most prudent plan to adopt, when, by one of those fortunate events which, occasionally, in my travels, I was so happy to experience, I was relieved from all perplexity.

"I learned that a merchant of Port-au-Prince was about to dispatch a brigantine to Havannah for the purpose of recovering the cargo of a vessel which had been wrecked in its vicinage.

"Instantly, altogether mindless of the comforts I began to enjoy in a country which I had so ardently desired to see; disregarding the want even which I physically experienced of some repose, I resolved to avail myself of this opportunity. Repairing, therefore, to the intendant of the colony, I obtained from him a passport in which I was designated botanist and physician. This latter title, to which I had just pretensions, possessing a diploma for the practice of physic, I conceived would enable me to travel with additional pleasantness, and render me less suspected than I might otherwise be in my incursion into New Spain. To conclude, I received, in lieu of six thousand livres promised me by the minister of the navy, no more than four thousand, a circumstance occasioned by the deficiency of money in the treasury.

"My preparations were simply and speedily effected: a few clothes, some fruit and other refreshments, but especially a number of phials, flasks, cases, and boxes of all sizes, comprised the whole of my little cargo.

"I embarked on the 21st January 1777, on board the brigantine Dauphin, pierced for sixteen guns, and an excellent sailer. At ten P.M. we weighed anchor, and by eight the next morning, under favour of a breeze from the east, were a-breast of the Point of Gonave."

By the third of February the Dauphin was lying in the harbor of Havannah. Now, the occupants of a foreign ship were not permitted by the Spanish to land in the city of Havannah except under special and unusual circumstances. The occupants of the Dauphin were advised that they must remain on board. But it was from Havannah that Thiery must find passage to Mexico. Falling sick, he addressed a letter to the governor and to the King's lieutenant explaining that since he was a physician and botanist there was no reason why they shouldn't let him land and furthermore that he was in very bad health because of being restricted to shipboard. His letters worked and soon Thiery was allowed to leave the ship. Within a short time he had so ingratiated himself with the elite of the city that he was completely accepted into Spanish society.

Thiery remained in Havannah for over six weeks looking for angles and means to get himself to Mexico (*4*).

"I thought it prudent still to use stratagem, and pretending to be actuated by that volatility and inconstancy of disposition, oftentimes with so little propriety ascribed to Frenchmen, and which ocasionally is so favourable a cover to deep designs, I feigned to be overcome with ennui from my long stay at the Havannah, and the too narrow limits prescribed me as a botanist. I readily obtained belief, and met with commiseration; and by this trick partly, and partly by a fortunate occurrence of which I availed myself, I succeeded to the height of my wishes.

"One day Don Manuel Feliz Ruick, the factor of the Assiento company, at whose house I had twice before been to obtain change for some joes, enquired if the report he had heard was true of my being a pupil of Mr. Jussieu. On my satisfying him in the affirmative, he informed me that he himself had been secretary to Don Antonio Uloa, one of the literary characters dispatched by the King of Spain, in company with our academicians to Peru; that he had been very intimate with him; and on account of his intelligence and social virtues, that he had a more tender regard for him than any man alive. This subject of our conversation gave room for my observing, that I also should have been delighted with an opportunity of visiting Peru; but that, as my time was limited, and my means deficient for this purpose, I should feel much pleasure if any chance should enable me to traverse Mexico. Don Ruick instantly tendered me his service towards procuring me the facility of making this journey; he was already highly interested in my favor from my intimacy with Mr. Jussieu, promised me letters for Don Antonio Uloa, at that time general of the fleet at Vera Cruz, and generously proffered to become my surety in a bond of a hundred thousand dollars."

With the help of Don Ruick and through the influence of other friends, Thiery was able to obtain a long promised passport for Mexico from the governor (*5*).

"I had now to treat for my passage: the master of the packet would take no less than a hundred hard dollars; the demand was exorbitant, but it was vain to reason, his avarice was inflexible: to all my arguments he opposed a truly Spanish phlegm and gravity, and coolly pocketed my money without once taking his cigar from his mouth. . . .

"At length, on the 11th March 1777, we went on board, and weighed anchor at eight in the morning, saluting the city and the seven citadels with one gun . . . .

"With what pleasure, as I left the port, did I contemplate those tiers of batteries, the citadels and forts which line the approaches to the

Figure 3
Raising cochineal in Mexico—rare 18th Century engraving

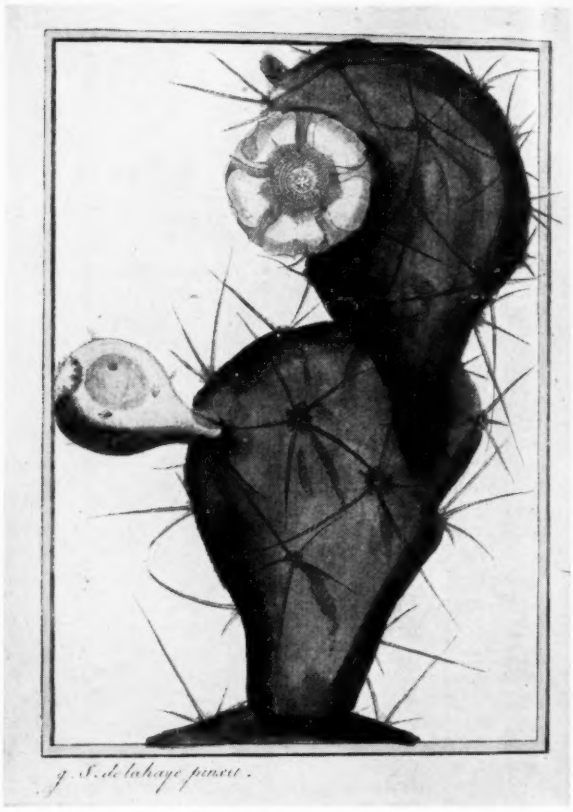


Figure 4
Nopal cactus

Havannah, and the innumerable mouths of thundering cannon with which they are furnished! On my arrival I fancied them all directed against me, all pointed towards the prevention of my scheme of obtaining the cochineal insect: how much then must I not have felt elated! how grateful the self-applause I enjoyed, at having had the temerity of braving, and the great good fortune of avoiding their terribly menacing rows! No; when the English captured this important place, they experienced no higher satisfaction at their success. Like them, I thought I held the key of Mexico: all future obstacles vanished from my sight, and already I possessed in idea the precious treasure which I sought."

After a rough voyage of thirteen days Thiery found himself anchored off of the harbor of Vera Cruz, the port city of Mexico. Just as in Havannah, Thiery was soon in the good graces of all of the important people of the city. Don Fernan Palacio, the governor of Vera Cruz, in fact granted permission to Thiery to reside in the city and to botanize for the French government. By making use of his knowledge of botany, Thiery actually became a veritable hero to the citizens of Vera Cruz. He showed them that the true jalap of Mexico actually grew in Vera Cruz and that there was no need to bring it at great expense from the city of Jalapa. Thiery in discussing this matter in his diary says *(6)*:—

"Such is the idleness, the ignorance of this people, that they give three reals a pound for this root at Jalappa, while they might have it for a quartetto at Vera Cruz if they would but take the pains to collect it.

"A discovery like this rendered me famous throughout the city: I was looked upon as a most extraordinary character in thus being able to discover a treasure in the very custody of those who were ignorant of its value. The esteem this gave me was grateful; and the good disposition of the people generally towards me, which my discovery occasioned, I endeavoured to maintain and augment, not only by the earnestness of my study of nature, which was no irksome task, but also by a species of quackery, which I reckoned serviceable towards concealing my definitive projects. Whether in the fields or in the streets I constantly had plants in my hand, and either employed myself in observing them through a magnifying glass, or in dissecting them with nicest care. My room was overspread with papers, covered with plants, and my tables with phials and boxes containing seeds.

"This policy indeed was requisite to form an excuse for my customs, and the walks I undertook, which else had been looked upon as as purely vulgar; for the pride and vanity of the Spaniards was not a little shocked at seeing me journeying on foot every morning the distance of four or five leagues, loaded with a port-folio, and attended merely by a single negro, who carried my books, a hatchet, a mattock, and my breakfast."

After some six weeks in the city of Vera Cruz, Thiery finally learned that the city of Gauxaca was the main center for the production of cochineal, and it was to this city that he determined to go for the accomplishment of his mission. But, in spite of every trick and every plan to obtain

a passport for travel into the interior of Mexico as far as Gauxaca, Thiery was completely unsuccessful. Soon, in fact, the governor became suspicious; Thiery became 'persona non grata' and was instructed to leave Mexico as soon as passage could be obtained. In Thiery's diary he tells of his despair *(7)*:—

"On leaving the palace I took a hasty leave of Mr. Fersen in the street, and repaired to my lodging, deadly sick at heart: I walked backwards and forwards, now threw myself on a seat, and now into my cot, swinging it from one side to the other with such violence as to risk breaking my head against the ceiling; not the least ray of comfort beamed on my mind; in vain did I exclaim to myself aloud, if possible, that I might listen and become less distracted. In vain did I exclaim, Be calm, thou mad man! poor intemperate fool, take pity on thy intellects! Art thou not yet at Vera Cruz? hast thou not reached this distance on thy road? and dost thou not still remain? Oh! yes, retorted anguish, but thou art ordered hence, thou must go, and empty-handed go thy ways! Thy plan of four years standing, even in the very port, now falls to wreck; four years are lost of the profession thyself selectedst; that hope of fortune vanishes! so fondly pictured in thy mind; the advances made by thy family, the bounty of thy sovereign are vain, and foolishly gone; thou failest in an affair undertaken in contradiction to the advice of thy father, thy friends, and every one; an affair which for four years has subjected thee to nothing but alarms, chagrin, mortification, toil, and dangers of every description; and what a blessed profit hast thou gained! Thou hast rashly pledged thyself to the minister, and what account hast thou to render? Shame, humiliation, ridicule, contempt, will be thy lot on every side thou turnest; and worst of all, thy object will remain unaffected: the Spaniards exclusively possess their cochineal! Thinkest thou of this, and dost not die of anguish? What then, is grief so little to be feared; is it so powerless of suffocation?"

But then says Thiery *(8)*:—

". . . . thou art still at Vera Cruz — the fundamental point of a desperate project presented itself to my ideas; I calculated, that as no appointed time was fixed for my departure, and as there was no ship in the port which would sail for three weeks to come, I might in a fortnight's time complete a stolen journey. Thou absolutely must, said I to myself, penetrate into the interior, though destitute of passport, must bear away the fleece for which thou hast failed, despite of all the dragons in the way. Inflamed by this idea, the very apprehension of being unable to realize it threw me into a cold sweat."

Theiry, determined to make this impossible trip, contemplates the obstacles that he would encounter *(9)*:—

"In the first place, nothing less than a miracle, on a road over which so many pike-men were dispersed for the purpose of arresting deserters and strangers, could guard me from being asked by some one or other of them for my passport.

"In the second place, my dress was not that of a Spaniard, and this inconvenience neither time or my means allowed of my remedying; this circumstance shewed me a foreigner, and exposed me the more to the looks of curiosity.

"Thirdly, an appendage to the last noticed predicament, I spoke the Spanish language very indifferently.

"In the fourth place, I was almost entirely ignorant of the road, and it was only by the merest chance and nicest management was enabled to learn by what gate I had to leave the town.

"Finally, it was necessary I should set out on foot, in a climate where I should have much to encounter from the season of the year, and the sands through which I had to travel. I must also go unprovided with linen, provision, change of dress, and books, and without instruments to reap the possible result of my excursion, in encreasing our knowledge of natural history.

"The plan I framed for remedying these inconveniencies was as follows: I shall travel on foot, said I to myself, as a botanical physician resident at Vera Cruz, in search of simples; I shall assume the appearance of taking a walk rather than being on a journey, shall lodge only in the poorest huts of the Indians, and in places away from the high road, pretending to have lost my way; I shall avoid all towns hamlets, and villages, where possible, and where not, pass through them by night; I shall declare myself a Catalan from the frontiers of France, which will explain the reason of my speaking French well, and the Spanish but indifferently; I shall always go neatly drest, wear some trinkets, affect a good-humored and free disposition, and pay liberally for all I take. With all these precautions I must indeed be unlucky if I should be taken for a foreigner or a deserter.

"In fine, after some little provision against the most urgent wants, for example, a broad brimmed hat, a net for the hair, a rosary, an indispensable article, &c; and after setting aside about three hundred gourds in quadruples, I fixed upon the Friday night following for my departure."

Now, Thiery had found out in a general way which roads led to Guaxaca: On Friday morning, as projected, he set off; made a preliminary trip outside of the city, and then at three in the morning, on the Saturday he scaled the walls of the city and started on his 'impossible trip' to Guaxaca.

Every conceivable type of bad weather, bad roads and other misadventures were Thiery's companions on the trip. He went many hours without food, climbed over raging torrents, up mountains, through forests and over burning plains. At night Thiery slept in the hut of some poor Negro or Indian. After several days of march, Thiery reached the city of Orissava. His reception and accomodations were typical. Thiery reports that *(10)*:—

"I was much fatigued with a march of eight leagues, through the rain, and over a bad road. I entered three inns in succession, but could meet with refuge in neither, their hosts objecting to receive me, and recommending me as a stranger to the casa reale, a kind of hospital for travellers, the name of which, however respectable, was repugnant to my feelings; so much does ignorance at times give formidable shape to names! At length I entered a fourth inn, called la casa grande: the front of it was a grocer's shop: within was a vast court, surrounded by arcades, which served as a corridor from top to bottom, and four sides of building; the casero introduced me at first into a room, bestrewed with the dung of the poultry which roosted in it. I looked at him indignantly, with my stick raised and ready to strike him, in case of his not shewing me some other apartment. Though less filthy, the chamber he gave me was nowise better furnished: a bed-frame of bambo, a table, a wretched seat, with one of its legs rotten, a doorway similar to that of a citadel, and the rusty hinges of which would not admit its closing; such

was the lodging I had to share with a posse of flapping bats: for supper I had four eggs, a dish of stewed beans, two Spanish radishes, and half a dozen lettice leaves; as for bread and wine I was obliged to seek them myself at the shop. Such an expenditure made me be considered of consequence, and for two reals I obtained a mattrass: my supper cost me four."

At this point Thiery was not certain of the route to Gauxaca and hit upon a plan to find this out. He entered a convent of Carmelites in Orissava and confided to the subprior *(10)*:—

" . . . that being a physician and botanist, my occupation was the study of natural history and plants; that for three years I had been on my travels in view of perfecting myself in this branch of science; that during a tempest I had made a vow to go on foot to Nsra. Snra. de la Soledad, in Guaxaca, which till now I had faithfully executed, but that, feeling myself exhausted with fatigue, and pressed for time in order to return for embarkation, I was solicitous of learning whether such a favorable interpretation of my vow could be admitted, as would allow my completing the residue of my pilgrimage on foot, in presenting, as was but reasonable, for the indulgence of deviating from the letter of my vow, certain pius offerings and alms. . . ."

At length the subprior fell into the snare and afforded Thiery with

". . . an itinerary so minutely detailed, league by league, and village after village, that the general of an army might have trusted to it for the plan of a march, as I had full means afterwards of ascertaining."

There were other trials along the road to Gauxaca besides the bad weather, poor food and danger from the Spanish king's soldiers to which brave men might well succumb; but not Thiery. In his diary he tells how he resisted *(11)*:—

"I resolved on entering an Indian cottage on the road, where I was well received, and treated with bread and eggs, all that can well be expected from this wretched class of men: but what struck and charmed me far beyond my meal, was the perfect beauty of the mistress of the cottage: I looked for faultiness in her, but, almost naked as she was, having nothing on but a furbelowed muslin petticoat, trimmed with a rose coloured cord,

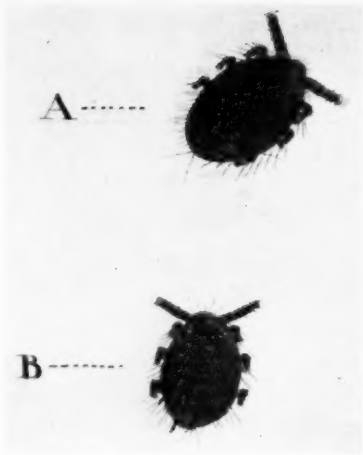


Figure 5
Wild cochineal insect grown in Haiti

A—Femelle de la Cochenille Sylvestre vue en dessous et groffie Comme au Microscope
(Female cochineal, underneath view)
B—Femelle de la Cochenille Sylvestre vue en deffus et Grofsie Comme au Microscope
(Female cochineal, top view)

and a shift which left her shoulders bare, the nicest scrutiny discovered no defect, her whole figure emulating in symmetry the regularity of her features. I told her she was very handsome: it seemed to please her and two old women who were present; the one her mother, and the other her aunt, laughed heartily on the occasion. I put many questions to her; and learnt she was married and had children; these circumstances but rendered her the more interesting, and her charms had even a disorderly effect on my senses. I ventured to draw forth a piece of gold; but recollecting myself: wretch! said I, what wouldst thou? Is such the object of thy toil? In a foreign country, friendless, and without support, environed by myriads of dangers still even springing beneath your feet, wouldst thou lose thyself? Wouldst yield to the enervations of voluptuousness? Madman away! With these self-reproofs I left the cottage without speaking a word, or daring to take another glance, and dragged myself, sighing along. When I had journeyed half a league, I found myself better: a thousand different ideas came to my assistance and consolation, and I found myself quite refreshed, proving what is said by La Bruyere, that "nothing more enlivens the spirits than the reflection of avoiding a folly"."

After many more days of travel, Thiery, now on horseback and with a companion picked up along the road, approaches the town of Galiatitlan, the town about which Thiery says *(12)*:—

". . . Not mines nor metallic wealth dost thou enjoy, perhaps, but for me, nothing that is curious; but thou first presented me with the object of my prayers and researches: yes, thou art the most lovely of hamlets!

"At Galiatitlan it was that, for the first time in my life, I saw the cochineal alive on the nopal by which it is nourished: I even trembled with extasy: the day before, my capuchin, who was very well acquainted with the country, on detailing its riches and cultivation, had mentioned to me cochineal. . . .

". . . at Galiatitlan, I saw a garden full of nopals, and had no doubt I should there find the precious insect I was so desirous to examine. I therefore leapt from my horse, under pretence of altering my stirrup leathers, entered the grounds of the Indian proprietor, began a conversation with him, and enquired to what use he put those plants? He answered, "to cultivate la grana." I seemed astonished, and begged to see the cochineal; but my surprize was real when he brought it me, for instead of the red insect I expected, there appeared one covered with a white powder. I was tormented with the doubts I entertained, and to resolve them bethought me of crushing one on white paper; and what was the result? It yielded the truly royal purple hue. Intoxicated with joy and admiration, I hastily left my Indian, throwing him two reals for his pains, and galloped at full speed after my companion, who was waiting for me at a wretched sugar-work, the canes about which, however, were superb. At last, said I to myself, I have seen this insect, have held it in my hands, I shall undoubtedly meet with it again, as I am now in the country where it is cultivated: the Indians assuredly will sell it me; and I thus shall be able to bear off my prize, the object and end of all my ardent wishes!

"Still certain reflections mixed gall with my delight: I could not hide from myself the difficulty I should have to bring to a safe haven an animal so light, so pliable, so easy to crush; an animal which, once separated from the plant, could never settle on it again: the shocks of the horse, a journey of a hundred leagues by land, could I hope with these to preserve it? and the enormous plants on which I

saw the insect, was it possible for me to transport them? how was I to hide them? and what a case must it not require to contain a tree eight feet high, by a diameter of five or six."

Thiery was impatient to reach the city of Guaxaca: the end of his voyage. Leaving his companions, he pushed on by foot and almost danced along into the city. With his usual intrepidity he was soon lodged at an inn, quickly made friends and arranged for cases to be made by which he might carry out a supply of nopal together with his precious cochineal. But how to obtain the nopals and the cochineal in the quantities that he needed without arousing suspicion? Thiery had a plan which worked to perfection *(13)*.

"The plan I had arranged, to purchase some nopals and cochineal on the succeeding day, occasioned me to wake very early in the morning: I was up therefore by three o'clock, and taking with me two Indian servants belonging to the inn, each with a large basket and towels, I repaired to the plantation of nopals I had seen the day before.

"I left the servants at the gate on entering and myself took charge of their baskets. The negro owner was scarcely awake. He came towards me with a simple, modest, and civil air, quite different from what is usual among people of his stamp in the kingdom of Mexico. I informed him that being a physician, I wanted, for the purpose of making an ointment for the gout, a few leaves of the nopal, with the cochineal upon them, which I begged him to sell me, as the case was urgent; telling him I was willing to pay for them whatever he might require: he permitted me to take as much as I pleased. I did not require twice bidding, but immediately selected eight of the handsomest branches, each two feet long, and consisting of seven or eight leaves in length, but so perfectly covered with cochineals, as to be quite white with them. I cut them off myself, placed them in the best possible manner in the boxes, and covered them with the towels. I then enquired what they were worth. . . . I gave him a dollar. . . . and while he overwhelmed me with gratitude, I called in my Indians, loaded them with the two baskets, and made off with the rapidity of lightning.

"My heart beat in a manner that beggars description: it seemed to me as if I was bearing away the golden fleeee, but, at the same time, as if the furious dragon, placed over it as a guard, was following close at my heels; all the way along I kept humming the famous line, At length I have it in my power, and should willingly have sung it aloud, but for fear of being overheard. . . .

"Thus, by five in the morning, I found myself in possession of a fine cargo of cochineal, which not a soul had either seen me purchase or pack. The negro who sold it me was a simple, good kind of man, and the Indians, whom I liberally rewarded, enjoining them at the same time to secrecy, with respect to where they had been with me in the morning, were themselves ignorant of what the precious load they carried."

Thiery now made haste to depart the city of Guaxaca and to return with his precious cargo to Vera Cruz. The nopals covered with cochineal were intermingled with a thousand other plants collected at random and all were packed carefully in boxes. With his pack train loaded and full of good spirits Thiery departed on his return journey. This return trip itself was not to be free of dangers and adventures. Thiery was again cheated by drivers, and brought before local authorities who almost perceived his daring thievery. In every case, however, Thiery's quick brain was able to outwit the local officials.

At last, Thiery with his precious cargo arrived at the gate to Vera Cruz. With some "double talk" to the guards and to the custom authorities, he and his cargo were soon inside the city gates, and all were soon lodged in his apartment without a single person observing him. Thiery was now in a position to gloat over the accomplishment of the most difficult part of his adventure *(14)*.

"I had now attained my wishes, and my satisfaction was extreme; my expedition was complete, and in the short space of twenty days, the half of one of which had been uselessly spent. I had also stopped two days at Guaxaca; so that I had travelled in sixteen days I had journeyed two hundred and forty leagues, of which forty on foot, over roads so bad as often to be almost impassable, under a burning sun, in a wretched country, without resources, and among people of whose language I was ignorant; in a country, in short, where I was destitute of a protector, or any connections, and where every public officer from his station ought to be inimical to me; to have effected, under such circumstances, so long and tiresome a journey, without illness, and without accident, was a matter so extraordinary, so lucky, that I scarcely was able to persuade myself of its reality."

But Thiery's satisfaction was short lived when he contemplated the dangers that still lay before him. He had to return by sea to Haiti and had to get his great treasure on board ship at Vera Cruz without arousing suspicion. In addition, he would probably have to stop at Havannah where he would again be subjected to examination. There was also the problem of taking care of the plants and insects on board the ship so that they would remain in healthy condition. Thiery was ready, however. He would do as he had done before; handle each problem as it came.

Now, to secure passage. Thiery first visited some of his friends in the city to throw them off the track. They, of course, were under the assumption that he had been away at nearby Medeline botanizing and enjoying the baths. Learning that a Spanish captain was planning to sail within a week for Cape Francois in Haiti and feeling perfectly satisfied that no one in the city knew of his trip to Guaxaca, he proceeded to arrange for passage with the captain. Finally, he paid his final respects to the governor who seemed pleased to learn of his final departure from Mexico. At last the fateful day arrived and as Thiery reported *(15)*:—

". . . I was not without some dread, and, in real truth, this appeared to me the decisive day. At day-break I caused all my cases of plants, as well as all my empty boxes, to be carried from my lodgings, and every thing before six had reached the gate of the quay. I computed that at this hour the idle would be yet asleep, that the soldiers and officers, tired with the night-guard, would be at rest in their hammocks, and that all unoccupied and inquisitive at the market: my conjectures were well founded, for if a few sailors be excepted, three or four officers, and the guard, I met with very few in the streets. I reached the port, followed by thirty porters, hired a boat, and returning to the quay, caused my cases, filled with earth, to be placed on the ground before the searchers: thus far, all went on very well; but in a few minutes, soldiers, sailors, and tradespeople all rushed forwards to see the plants which the French botanist was bearing away. The officer of the guard complimented me on my researches and collection of herbs; the searchers admired them in

stupid astonishment, but at the same time were so civil as not to sound any of the cases, though they might have done so without injuring any of my plants; and the head of the office, satisfied with my readiness to suffer examination, told me I might pass on. . . ."

It was still some days before the ship finally sailed. The return voyage was a most difficult one. It began on June 8, 1777. There were storms and hurricanes and at times it seemed as if the ship would go under. Day by day the nopal plants died despite the care of Thiery. By the 20th of June the ship had reached the harbor of Campeachy. At Campeachy the ship was delayed for a number of days waiting on a shipment of dye-wood for the French colonies. Finally, on the 11th of July, Thiery and his ship left Campeachy for another long and frightful voyage. More nopals died and it looked as if little of his precious cargo would remain. By the first of August the ship was in sight of Havannah but a landing at the city was avoided.

Finally, on the 4th of September, after a voyage of almost three months, Thiery with the remainder of his cargo was placed ashore at Mole Saint Nicholas in Haiti. Thiery writes the final pages in his diary *(16)*:—

"My first care was to wait upon M. de la Valtiere, the King's lieutenant, at Saint Nicholas Mole. I informed him who I was, and what the object of the voyage I had undertaken. He loaded me with kindness, sought how to render me service by every means, and punished according to their merits some sailors who had given me cause of complaint. I had here also the good fortune of forming an acquaintance with Messrs. Dunsteville and Dumanoir, of the engineer service, who shewed me the greatest civility.

"I now wrote to the intendant of the colony, but burning with impatience to reach Port au Prince, without waiting his answer, I availed myself of the offer of M. de Vassal to repair thither, in a King's galley, which he commanded. We sailed on the 17th September, and on the 25th arrived at Port au Prince.

"The intendant gave me a most kind and gracious reception: he ordered payment of the two thousand livres due to me, according to the direction of the minister; and moreover, gave me an appointment under himself, with a thousand crowns a-year.

"The pleasure I felt at seeing my friends again, the fatigue I endured on my voyage, the change of air and diet, all combined, occasioned me a sickness of more than six weeks duration.

"As soon as I recovered, I wrote to my parents and friends. I forwarded a relation of my voyage to the minister, and dispatched the first specimens of the plants I had brought from Mexico for the King's garden; but all these were lost with Captain Gillet, on his return from the Cape, whither he had come in the Postillon of Rochelle, with the first intelligence of an embargo."

But soon bitterness was intermingled with the sweetness of Thiery's success *(16)*:—

"I did not enjoy the sweet arising from the success of my expedition without some bitter mingled in the cup. I had effected a matter of public utility, and could but become a butt for the arrows of envy; still the shaft which struck the deepest, and caused the greatest pain, was an insinuation attributed to have been circulated by the Spanish captain, by a man so truly my friend, that I had stolen my cochineal.

"It was however impossible that any such like charge could have been made by the captain: for, separate from his being most affectionately attached to me, I never had told him so; but, on the contrary, as was the truth, that I had bought them at four different places in Mexico; . . .

"I think I do not deceive myself with respect to right and wrong. To have stolen the cochineal would, in my opinion, have been an act of social injustice, as far as regards the cultivator whose garden I might have despoiled, an injustice which I sought to avoid, and I think successfully; for by buying it, I only committed a wrong against the nation from whom I bore it away: now, in my position, I regarded myself as the prototype of a different nation, on whom nature has bestowed the same prerogatives, the same right to her favours; and if, after offering payment for the cochineal at whatever price might have been imposed, all the Indians to whom I might have applied had combined to refuse my request, I should then have considered myself, as in case of war, absolved from the restrictions of social laws; but in infringing them, in carrying away by stratagem what had been denied to entreaty, I would have compensated the individual toward whom I might be guilty of a real injury, and have covered with pi-asters the ground from which I bore off my prize.

"From the sentiments which thus with the utmost sincerity I have exposed, let it be judged if I have ought wherewith to reproach myself. Were I to decide, from my heart should I gain acquittal; but on a subject so delicate, and involving myself, I must leave with others to decide."

Thus ended Thiery's diary and, within a short time, his own life. Thiery died in the year 1780; it has been said that his early death was due to disappointment and vexation at seeing his patriotic endeavors "so little assisted and his services so sparingly rewarded by the government *(17)*."

Note: Thiery de Menonville actually began raising the domesticated cochineal which he brought back from Mexico and a wild variety which he found living in Haiti on his return. Upon his death his gardens were neglected and the Mexican cochineal insects were allowed to perish. A French cochineal industry did flourish, however, for some years based on Thiery's work with the wild cochineal native to Haiti.

Thiery's diary of his "Voyage to Guaxaca" and his notes on the culture of cochineal were found several years after his death and published together with an "Eloge," at Cap-Francais (now Cape Haitian) in 1786. This work is today quite rare. An English translation of Thiery's "Voyage" appeared in Vol XIII, on pp 753-875 of John Pinkerton's "A Collection of the Best and Most Interesting Voyages and Travels in all Parts of the World," London, 1808-1814. The quotations from Thiery's diary are taken from Pinkerton's work.

LITERATURE CITED

(1) Thiery de Menonville, "Traité de la Culture du Nopal et de l'Education de la Cochenille Dans les Colonies Francaises de l'Amerique! Precédé d'un Voyage a Guaxaca." Eloge, Vol I, IC (Cap-Francais, 1787).
(2) Thiery de Menonville, Vol I, CIII.
(3) Pinkerton, John, "A Collection of the Best and Most Interesting Voyages and Travels in All Parts of the World," Vol XIII, 753 (London, 1808-14).
(4) Ibid, 766-7.
(5) Ibid, 768.
(6) Ibid, 775.
(7) Ibid, 788.
(8) Ibid, 789.
(9) Ibid, 790.
(10) Ibid, 799.
(11) Ibid, 801.
(12) Ibid, 818.
(13) Ibid, 826.
(14) Ibid, 848.
(15) Ibid, 853.
(16) Ibid, 875.
(17) Bancroft, Edward, "Experimental Researches Concerning the Philosophy of Permanent Colors," Vol I, 424 (London, 1813).

Note: See correction notice on page 32 regarding "A Look at the Early Dyers' Guilds", an earlier paper in this series by Dr Edelstein.

Proceedings of the
American Association of Textile Chemists and Colorists

Copyright, 1958, American Association of Textile Chemists and Colorists

January 13, 1958

1957 Intersectional Contest
2nd Prize Winner———

IDENTIFICATION OF DYESTUFF CLASSES ON DYED NATURAL AND SYNTHETIC FIBERS*

NEW YORK SECTION

COMMITTEE
D A SHIRAEFF, chairman
General Aniline & Film Corp
E C HANSEN, secretary
General Aniline & Film Corp
C H BRUBAKER†, speaker
Standard Bleaching & Printing Co
W F BROMMELSIEK†
Forstmann Woolen Co
M FARBER
United Merchants & Manufacturers, Inc
P J FYNN
J C Penney Co, Inc
A J KELLNER
United States Testing Co, Inc
J E LOUGHLIN†
National Aniline Div,
Allied Chemical & Dye Corp
P J LUCK
Ciba Co, Inc
D E MARNON
Berkshire Color & Chemical Co
S MOORADIAN
Geigy Chemical Corp
B F QUIGLEY
E I duPont de Nemours & Co, Inc
F C RIPPNER†
Union Carbide Chemicals Co
P B ROTH†
American Cyanamid Co
C H A SCHMITT
Sandoz, Inc
M G STERN†
Ciba Co, Inc
P J WOOD
Royce Chemical Co

† Subcommittee chairman

The paper systematizes and presents the procedures for the identification of classes of dyes on natural and on synthetic dyes in such a way that a technician who is not experienced in the textile business can readily arrive at a correct conclusion.

The paper consists of six parts and an introduction.

Part I deals with the identification of 13 classes of dyes used on cotton and rayon. These 13 classes are divided into four analytical groups.

I—Dyes recognizable by redyeing of their bleed-off on cotton from an ammoniacal solution, or on wool, tannin-mordanted cotton, or Orlon 42 from an acetic acid bath.

II—Dyes recognizable by their property to change shade on reduction with alkaline sodium hydrosulfite and reverting back to the original shade on reoxidation by air.

III—Dyes recognizable by their complete destruction in alkaline sodium hydrosulfite, and by inability to obtain from the bleed-off a re-dyeing on white cotton, wool, or tannin-mordanted cotton.

IV—Pigments

Part II takes up the identification of nine classes of dyes used in wool and silk dyeing. The procedures in this part are arranged in such a way that an analyst proceeds from the most easily recognizable classes down the list until his sample gives the prescribed set of reactions.

Part III gives a method for the identification of five classes used on acetate and on Arnel.

Part IV deals with identification of nine classes of dyes used on two types of nylon. These nine classes are divided in two analytical groups based on their preferential solubilities in organic solvent or in water.

Part V gives the method for the identification of five classes of dyes used on acrylic fibers, Orlon, Acrilan and Dynel. These five classes are divided in two analytical groups using the same principle as in the case of nylon.

Part VI describes the means for identification of Dacron.

INTRODUCTION

A SYSTEMATIC analytical procedure is, in essence, a logical classification of certain unifying properties or characteristics of individual components of a total body of the subject material. A properly chosen classification of more general properties splits this body into groups, alike within themselves but differing from each other.

By further choice of some other, more specific properties, a differentiation among the individual members of each group is accomplished.

A systematic analysis is, therefore, not only a search for a set of given properties and behavior, to which an unknown sample corresponds but, also, and perhaps more so, a systematic exclusion of all that this sample cannot be.

The principle of systematic exclusion, which progressively eliminates all that is impossible, bringing to focus a limited number of possibilities, among which the choice should be made, simplifies the work of an analyst and enhances chances of his arrival at a correct conclusion.

The method of analysis presented in this paper covers practically all dyestuffs (excluding the new fiber-reactive dyes because their chemistry has not yet been sufficiently disclosed) and most of the important pigments which are used in the textile industry.

The material in this paper is divided into six parts. Each part deals with an analysis of dyes on a particular fiber. Every part which takes up the synthetic fibers opens with the test for the subject fiber. This is followed by a list of dyes used for coloring these fibers.

The very identification of a fiber eliminates all those dyestuffs which are not applicable to this fiber.

This elimination would be small in the case of cotton, for the dyeing of which all textile dyes can be employed with the exception of but a few. On the other hand, in the case of Dacron sample, this elimination would be so complete that the test for the fiber would practically identify the class of dyestuff it is dyed with.

In developing this method, when-

*Delivered by C H Brubaker on November 15, 1957 at the 36th National Convention, Hotel Statler, Boston, Mass, and on December 6, 1957 before the New York Section at Hotel Sheraton McAlpin, New York, NY.

ever possible and advantageous, procedures were worked out to split into groups the total number of dyes applicable to a particular fiber. These procedures rapidly concentrate the attention of an analyst on but a few possible classes, among which he has to make a choice. Procedures for the differentiation of the individual members of each group facilitate further his arrival at a choice which is correct.

All that is stated does not imply that the method works automatically and that an analyst is nothing but a mechanical performer. On the contrary, the successful application of the method depends on the creative thinking of the one who uses it. For example, in the testing of the method in some of the cooperating laboratories, the errors in identification were clearly due to incorrect understanding of the principles of the method. A naphthol dyeing on cotton was identified as a direct dye aftertreated with formaldehyde. The given reason for this was the positive test for formaldehyde, which this sample gave. The analyst in this case placed the sample correctly in Group III. But this group consists of four classes——— metal-treated direct formaldehyde-treated direct, naphthols, and diazotized developed dyes. The analyst stopped too short, for he did not exclude the possibility of a naphthol dyeing to the tests for which the sample would certainly have also given positive reactions. Then, the positive formaldehyde test could be ascribed logically to the presence of an anti-crease resin on the sample, which was the actual case.

In another instance, an extremely pale pink shade of a direct dyeing was identified as a diazotized and developed dyeing. The reason given was that this sample failed to respond to the tests of Group I; the sample failed to bleed in water and ammonia. It is futile to expect that 100-300 mg of a very pale shade would produce a noticeable bleeding. Sizes of test tubes and other apparatus, amounts of samples and reagent, time of operation, etc, as given in the method, are given as examples. An analyst may vary them to suit his personal preference and, when confronted with an unusual sample, must vary them. In the case of the pale pink, the analyst should have taken a very much larger sample, boiled it in larger amounts of reagent, and then, concentrating the extract, should have tried the redyeing test on white cotton. He would have, then, struck closer to the truth.

An indocarbon dyeing was identified as a vat dye because it produced a redyeing on white cotton from a caustic and hydrosulfite bath. But it also would have redyed from a sodium sulfide-sodium carbonate bath, which vat dyes would not. Here again the error was due to the failure to exclude all the possibilities of the correctly chosen group.

These examples are cited for the purpose of clarifying further the principles of the method and the importance of constructive thinking by an analyst applying this method.

This method is the first and the only systematized procedure for the identification of dyestuff classes on textile fibers.

The search of the literature failed to reveal any previous work adaptable for developing a method of this kind.

Consequently, the method is not a compilation from books or journals, but is an original cooperative work based on actual experience in the field by the members of the New York Section's 1957 Intersectional Contest.

I. DYES ON CELLULOSIC FIBERS (COTTON AND RAYON)

Cotton and rayon are readily recognizable by their even burning, leaving a soft ash (no bead) with an odor characteristic of burning paper.

The following dyestuff classes are used in the dyeing of cotton and rayon (regenerated cellulose):

A) direct dyes
B) acid dyes
C) basic dyes
D) direct dyes aftertreated with resins
E) sulfur dyes
F) vat dyes
G) water-soluble leuco esters of vat dyes
H) oxidation blacks (aniline and diphenyl)
I) direct dyes aftertreated with metals
J) direct dyes aftertreated with formaldehyde
K) naphthols and insoluble azo dyes
L) diazotized and developed dyes
M) pigments.

The procedure for the identification of dye classes is, in general, the same for rayons as for cotton. The exception is with pigments when these are introduced into a solution of cellulose prior to spinning in the so-called "spin- or dope-dyeing" technique. When rayon is "spun-dyed", pigments are within the fiber and special procedures are required.

Group I

Group I includes the following dyes:

A) direct dyes,
B) acid dyes,
C) basic dyes, and
D) direct dyes aftertreated with resins.

A) DIRECT DYES———Place 100-300 mg of a sample in a 35-cc test tube; add five to 10 cc of water, one-half to one cc of conc ammonia and boil to bleed off a sufficient amount of dye for redyeing on a piece of white cotton.

When a sufficient amount of dye has bled off the sample, remove the sample and place in the test tube a piece of white cotton weighing 10-30 mg and five to 30 mg of common salt. Raise to the boil and boil gently for 40-80 seconds; cool to room temperature, remove the cotton, rinse and examine.

Redyeing on cotton in an ammoniacal solution in the presence of salt to a shade and strength comparable to the strength and shade of the original sample is definite proof of direct dyes.

B) ACID DYES———If a sample under test (A) bled but left the cotton white or only slightly stained, neutralize the colored extract obtained under (A) with acetic acid, then add an excess of one cc 10% acetic acid and place 10-30 mg of white wool in the liquor and boil for approximately half a minute, rinse and examine.

Redyeing on wool from an acid bath proves the presence of acid dyes, provided the presence of a direct dye is not shown by test (A), and basic dyes by test (C).

C) BASIC DYES———If the dyed sample does not bleed, or bleeds only slightly, under test (A), it should be tested for the presence of a basic dye.

Place 100-300 mg sample in a 35-cc test tube; add one-quarter to one-half cc of glacial acetic acid; warm over a Bunsen burner, add three to five cc water, boil, remove the sample, add five to 20 mg of Orlon 42 or tannin-mordanted cotton; continue boiling for 60-80 seconds.

Redyeing on Orlon or on tannin-mordanted cotton is proof of the presence of basic dyes.

Confirmatory Test. If the above bath, after the redyeing has been made, still contains color, it can be used for the confirmatory test, other-

wise a fresh glacial acetic acid extraction must be made. Add to this extract five to seven cc of 10% caustic soda solution, cool, add three to five cc of ether, close the mouth of the test tube with the thumb, and shake well to assure extraction of the basic dye base into the ether layer. Allow to separate into layers; add water to bring the top of the ether layer to the mouth of the test tube. Decant *part* of the ether layer only into a 10-cc test tube, add two to five drops of 10% acetic acid and shake well. The base of any basic dye will leave the ether and appear as the original color in the acetic-acid layer.

D) DIRECT DYES AFTER-TREATED WITH RESINS———If the dyed sample failed to bleed or bled but slightly when tested under (A) and the test under (C) for the presence of basic dyes was negative, investigate the possibility of resin-aftertreated direct dyes.

Place a 100 to 300-mg sample in a 35-cc test tube; add 10-15 cc of a one percent solution of hydrochloric acid and boil for 20-40 seconds. Discard the acid, add a fresh portion and repeat this procedure once or twice and rinse. This removes the resin.

If the sample now bleeds freely in ammonia water and responds fully to test (A), then the original dyeing was a direct dye aftertreated with resins.

Group II

Group II includes the following dyes, which change shade on reduction with alkaline sodium hydrosulfite and revert to the original shade on reoxidation by air:

E) sulfur dyes,
F) vat dyes
G) water-soluble leuco esters of vat dyes, and
H) aniline and diphenyl blacks.

All samples should be tested for Group I before testing for Group II.

Preliminary Test. Place a 50 to 100-mg sample in a test tube; add three to six cc of water and one to two cc of 10% caustic soda. Raise to boil and add 10-30 mg of sodium hydrosulfite, boil two to five seconds.

All dyes in this group change shade radically with the exception of the Indanthrene blues, which bleed profusely when the sodium hydrosulfite is added, bleeding not at all or only slightly during the caustic-soda treatment.

Remove the sample and place it on filter paper. All dyes belonging to this group reoxidize to the original shade.

All dyes in this group reoxidize immediately or within five or six minutes.

The Indanthrene blues do not show much color change on reduction. The color of the leuco compound is blue, differing only slightly in shade from the fully oxidized dye.

Confirmatory Test for Indanthrene Blues. Place a ¼-inch square of the sample on several layers of filter paper, wet with one or two drops of concentrated nitric acid and the sample turns yellow or green. Blot the sample with filter paper, and the blot is pure yellow in color. Touch this blot with a few drops of "Reduction Solution", and the blue color of the original Indanthrene blue is restored.

Reduction Solution consists of equal parts by weight of stannous chloride, hydrochloric acid conc, and water.

E) SULFUR DYES———Place a 100 to 300-mg dyed sample in a 35-cc test tube. Add two to three cc water, one to two cc of 10% sodium carbonate solution and 200-400 mg of sodium sulfide chips.

Raise to the boil and boil for one to two minutes. Remove the samples, add 25-50 mg white cotton, 10-20 mg of common salt to the test tube and boil for one to two minutes.

Remove the cotton sample, place on filter paper and allow it to reoxidize.

Sulfur dyes redye cotton in a shade which differs from the original only in strength.

A few, easily reducible vat dyes will color the white cotton, but in a shade markedly different from that of the original dyeing.

Confirmatory Test for Sulfur Dyes. Boil 100-150 mgs of the original sample in five to 10% caustic soda solution, rinse well. Place in a 15-cc test tube. Add two to three cc of "Reduction Solution". Wrap a piece of filter paper over the mouth of the test tube. Place a small drop of an alkaline solution of lead acetate on the center of the filter paper. Plunge the test tube into a 250-cc beaker containing boiling water.

In 40-80 seconds the lead acetate spot on the filter paper turns dark brown or black when sulfur dyes are present.

Alkaline lead acetate is prepared by adding 10% caustic soda solution to a 10% solution of lead acetate until the precipitate first formed redissolves.

To prevent this solution from drying on the filter paper during the test for sulfur dyes, 20-25% of glycerine is added.

F) VAT DYES———Place a 100 to 300-mg dyed sample in a 35-cc test tube. Add two to three cc water and one-half to one cc of 10% caustic soda solution; raise to boil; add 10-20 mgs of sodium hydrosulfite and boil for another one-half to one minute. Remove the sample and add 25-50 mg white cotton and 10-20 mg of salt, keep boiling for 40-80 seconds, then cool to room temperature. Remove the cotton and place it on filter paper to oxidize.

Redyeing of cotton to a shade differing only in strength from the original dyeing proves the presence of vat colors.

This conclusion is valid only if sulfur dyes were ruled out by test (E).

G) WATER - SOLUBLE LEUCO ESTERS OF VAT DYES (ALGOSOLS, INDIGOSOLS, ETC)——— These are water-soluble derivatives of ordinary vat dyes. In a finished dyeing they become identical with vat dyes. The procedure for the identification of this class of dyes is therefore identical with method (F), Vat Dyes.

H) OXIDATION BLACKS (ANILINE AND DIPHENYL)———Neither of these redyes cotton from either sodium sulfide—sodium carbonate or sodium hydrosulfite—caustic soda.

Confirmatory Test for Oxidation Blacks. Place 100-300 mg dyed sample in a #1 evaporating dish*, pour two to three cc concentrated sulfuric acid over sample and rotate just long enough to extract the dye. Pour extract into 35-cc test tube containing 25-30 cc water, filter through five to seven cm filter paper, wash several times with water. Spot side of paper with a few drops of 10% caustic soda solution. Spot turns red violet.

*Fisher Scientific Cat #8-693

Group III

Group III includes the following dyes, which are destroyed in alkaline sodium hydrosulfite and do not redye white cotton from their bleeding in water, water-ammonia or acetic acid:

I) direct dyes aftertreated with metals,
J) direct dyes aftertreated with formaldehyde,
K) naphthols and insoluble azo dyes, and
L) diazotized and developed dyes.

Preliminary Group Test. Place 100-

300 mg of the dyed sample in a 35-cc test tube with three to five cc of water, one and one-half to three cc of 10% caustic soda solution, and 20-40 mg sodium hydrosulfite, raise to boil, and boil for three to five minutes.

All dyes of this group are destroyed, some immediately, some on prolonged boiling.

The destruction of dyestuff is manifested by permanent change from the original shade to white, greys, yellows, and orange shades. This change takes place both on the sample itself and in the extract. Reoxidation of the sample does not restore the original shade.

I) DIRECT DYES AFTERTREATED WITH METALS——These dyes are recognized by the presence in their ash of chromium or copper.

Test for Chromium. 100-200 mg of sample is placed in a #000 porcelain crucible. The sample is completely ashed; when all the carbon is consumed, 50-150 mgs of a flux are added, and the ash fused. The flux consists of equal parts of powdered sodium carbonate and sodium nitrate. When chromium is present, the fused mass shows an orange yellow color while hot and a permanent greenish yellow when cold.

Test for Copper. If the test for chromium is negative, ash another portion of the sample, dissolve the ash in about one-quarter to one-half cc of concentrated nitric acid, add one to two cc of water and boil, transfer the solution into a test tube, cool, and add about one to two cc of concentrated ammonia. If copper is present, the solution turns blue.

J) DIRECT DYES AFTERTREATED WITH FORMALDEHYDE——The presence of formaldehyde in the sample is proof of the presence of this class of dyes.

Test for Formaldehyde. Heat a sample to near boiling in five percent solution of sulfuric acid, allow to cool, add this extract drop by drop to one-tenth percent Carbazol dissolved in concentrated sulfuric acid. The formation of a blue precipitate indicates the presence of formaldehyde.

The dyes whose fastness to washing is only slightly improved by aftertreatment with metals or formaldehyde respond to the tests under Group I, but their bleeding in water-ammonia would be insufficient for a good redyeing on white cotton.

CLASSES K AND L——These two classes of dyestuffs are totally different in their properties but related to each other in that the final dye as it appears on the material is never present as such in a dyebath but is formed *in situ* on cotton.

In the case of diazotized and developed dyes, cotton is dyed with a suitable direct dye. This dyeing is diazotized and then treated in a developing bath. In this way a new dyestuff of increased molecular weight is formed on the fiber. Due to the increased size of the molecule, the solubility of this new dye in water is greatly reduced, hence the increased fastness to washing.

In the case of naphthols, certain phenolic compounds possessing an affinity for cotton are first applied and then treated in a solution of certain stabilized diazonium salts, whereupon a dyestuff is formed *in situ*. Neither of the two parts entering into the formation of the dyestuff possesses water-solubilizing groups. The dyestuff formed is, therefore, water-insoluble.

In this systematized scheme of identification, these two classes of dyes are placed at the very end of the procedure, when all other possible classes of dyes have been eliminated. The problem is narrowed down to the question of differentiating between them.

K) NAPHTHOLS AND INSOLUBLE AZO DYES——The most characteristic property of this class is bleeding in pyridine. 20-50 mg of the dyed sample is placed in a 10 to 15-cc test tube, one to two cc of pyridine is added, and the sample is boiled. All naphthol dyeings bleed, some profusely, others less. Due to their water insolubility, naphthols reduce much slower in caustic soda and hydrosulfite than any other class of this group.

Confirmatory Test. Place 100-200 mg of dyed sample in a 10 to 15-cc test tube; add two cc 10% caustic soda solution and five cc alcohol; boil and add five cc water and sodium hydrosulfite; boil again, and after color is reduced, cool and filter. To filtrate, add 10-20 mg white cotton and 20-30 mg salt, boil one to two minutes, cool, and remove cotton. A yellow dyeing which fluoresces in UV confirms that the original was dyed with a naphthol or printed with an insoluble azo dye.

L) DIAZOTIZED AND DEVELOPED DYES——These are identified by exclusion of all other classes of this group. Diazotized and developed dyeings do not bleed in pyridine* and they reduce readily in boiling caustic soda and sodium hydrosulfite.

Occasionally, part of the dye will be poorly coupled and bleed in water-ammonia in the tests of Group I. This bleeding, however, is only slight and of a different shade than the original dyeing, and redyeing on white cotton is impossible or too poor to warrant placing in the class of straight direct dyes.

Group IV

Pigments do not generally respond to the reactions of the three groups of dyes, or if they do, the reactions are slower and often incomplete.

It is possible that rayon may be colored with pigments in two ways: 1) with resin binders, or 2) spin-or dope-dyed.

M-1) VAT PIGMENTS——The test is the same as for Group II under (F). If the reactions do not proceed smoothly, wet the dry dyed sample with one-half cc N-methyl-2-pyrrolidone (General Aniline & Film Corp, New York 14, NY) and heat over a Bunsen burner; then proceed with the regular test. Pretreatment with methyl pyrrolidone will plasticize the resin binder and eliminate or minimize its interference.

In the case of rayon spun dyed with vat pigments, the pretreatment with methyl pyrrolidone does not always help. In this case, a very useful solvent is a 35% solution of benzyl trimethyl ammonium hydroxide in methyl alcohol (Midwest Labs, Inc, 1952 W Irving Park Road, Chicago 13, Ill).

Place 50-100 mg of the sample in a 35-cc test tube and add two to three cc of a 35 solution of benzyl trimethyl ammonium hydroxide in methyl alcohol to the contents brought to a boil. After all the methyl alcohol has evaporaed, boil for an additional one-quarter to one-half minute. Add two to three cc of water and 10-20 mg of sodium hydrosulfite. The sample will react as in test F, Group II.

M-2) AZOIC PIGMENTS——Place 100-200 mg of the dyed sample in a 35-cc test tube and one-half to one cc of methyl pyrrolidone and heat the contents over a Bunsen burner for one-half minute. Cool. Add one to two cc of five percent caustic soda solution and 25-50 mg of sodium hydrosulfite. Boil until the dyed sample

*Some of these dyes might tint pyridine. When this is the case, for reassurance, repeat the test on the same sample with two to three fresh portions of pyridine. The tinting by some of these developed dyes decreases rapidly and in most cases terminates completely. The bleeding in the case of naphthol dyeings continues at the same rate, since solubility in pyridine is an inherent property of all naphthol dyeings.

is reduced to a white, light yellow, or orange.

To differentiate between diazo coupling with Naphthol AS or Beta Naphthol, filter the solution from the above test into another 35-cc test tube, add 20-50 mg of white cotton and 10-20 mg of common salt. Raise to boil and boil for one-half to one minute, then cool to room temperature. Remove the cotton and dry in the air.

Naphthol AS series couplings will be yellow and remain this color. Under ultraviolet light they will fluoresce yellow.

Beta Naphthol couplings will darken on drying and with time turn brown. Under ultraviolet light they will fluoresce bluish white.

When a sample of spun-dyed rayon is encountered, use benzyl trimethyl ammonium hydroxide. This procedure should also be followed to determine the following pigments.

M-3) PHTHALOCYANINE GREEN PIGMENTS———Place 50-100 mg of sample in a 35-cc test tube and add one-half cc methyl pyrrolidone. Heat to a boil, then cool below 70 to 80°C. Add one to two cc of 10% caustic soda solution and 20-40 mg of sodium hydrosulfite. Heat to a boil. Phthalocyanine Green reduces dark violet. Remove the sample and place it in 20% acetic acid solution.

The reduced phthalocyanine green remains violet.

M-4) PHTHALOCYANINE BLUE PIGMENT———Does not reduce when treated as under M-3. Phthalocyanine Blue spotted with concentrated nitric acid turns violet, and when spotted with concentrated sulfuric acid, turns bright green.

M-5) ALCIAN BLUE———When tested in accordance with (M-3), turns violet on reduction and changes to green in 20% acetic acid solution. Spotting with concentrated nitric acid turns it violet and concentrated sulfuric acid turns it green.

M-6) LUSANE BRILLIANT BLUE———Gives the same spot tests with nitric and sulfuric acids as above (M-5). When tested in accordance with (M-3), it reduces to a royal blue, and in 20% acetic acid it turns violet blue.

M-7) MINERAL PIGMENTS———These consist of iron oxides, manganese and chromium oxides and ultramarine blue. The presence in large quantities of these metal oxides in the ash of a sample is the test for mineral pigments. Ultramarine blue is indestructible by ashing and the ash of a sample colored with this pigment is bright blue.

M-8) CARBON BLACK———Determined by exclusion of other possible pigments, by inertness to spotting with concentrated sulfuric and nitric acids, or by small and white ash upon burning. A microscopic examination reveals the crystals of carbon scattered along the filaments of the sample.

II. DYES ON WOOL AND SILK

Wool and silk are differentiated from others by their complete solubility in boiling five percent caustic soda solution.

The following dyestuff classes are used in the dyeing of wool:

A) basic dyes
B) direct cotton dyes
C) soluble metalized dyes (acid-dyeing)
D) acid dyes
E) chrome dyes
F) dispersed metalized dyes (neutral-dyeing)
G) vat dyes
H) leuco esters
I) naphthols.

The same classes of dyes are used for silk, with the exception of chrome dyes (E).

The procedure of identification for the dye classes are the same for silk as for wool.

A) BASIC DYES———Place a 100-400 mg sample of dyeing in a 35-cc test tube. Add 10 cc alcohol and boil. Remove the dyed sample. Evaporate the alcohol solution almost to dryness, add five cc water, boil to remove the alcohol. Add one-quarter to one-half cc of 10% caustic soda, cool to room temperature, add five cc ether, and shake to insure complete extraction of the basic color. Pour into a 10-cc test tube, let the layers separate, decant most of the ether layer into another five- or 10-cc test tube, add a few drops of 10% acetic acid, and shake.

Basic dyes change from the base form to the salt form and, leaving ether, they appear in acetic acid in the shade as they are in the dyed sample.

Additional proof of the presence of basic dyes is obtained by placing a thread of mordanted cotton in the test tube prior to adding caustic soda and boiling until the thread is dyed.

B) DIRECT COTTON DYES———Place a 200-300 mg sample of dyeing in a 35-cc test tube, add five cc water and one cc concentrated ammonia, and boil the sample in this solution one to two minutes. Remove the dyed sample, add 30 mg salt and 10-30 mg white cotton for one to two minutes, remove the cotton and rinse.

If a direct dye is present, cotton is dyed a deep shade. It is important to obtain a deep shade of dyeing as some acid dyes stain cotton, but never to a deep shade.

C) SOLUBLE METALIZED DYES (ACID DYEING)———The procedure is the same as under (B) Direct Cotton Dyes.

Acid dyes and soluble metalized dyes are differentiated by the presence of chromium in the ash of the latter.

Ash 300-500 mg sample in a #000 porcelain crucible, add 0.5 g sodium carbonate-sodium nitrate mixture and fuse. Bright red yellow color, when hot, and distinctly yellowish color when cool indicates chromium.

D) ACID DYES———The procedure is the same as under (B) Direct Cotton Dyes, but instead of adding salt, neutralize the ammonia with a 10% sulfuric acid solution and add a few drops of acid in excess. Place in the test tube a 20 to 40 mg piece of wool and keep boiling for one to two minutes.

Redyeing of the extracted dye on wool from this acid bath is the proof of the presence of acid dyes.

This test is valid only if the previous test on redyeing on cotton and the test under (C) Soluble Metalized Dyes were carried out. If the test under (B) is negative and under (D) is positive, then the sample was an acid-color dyeing. If the tests are positive both under (B) and under (D), then it is a union dyeing and the sample is a blend of wool and cotton.

E) CHROME DYES and
F) DISPERSED METALIZED DYES (NEUTRAL-DYEING)———When the test procedure as described under (D) Acid Dyes is applied to these classes, two things occur.

1) In the first case, from a water-soluble dye or a potential dye and a chromium-wool complex, a *water-insoluble dye* is formed *in situ* during the process of the dyeing. Therefore it is impossible to extract any dye. However, when such a dyeing is subjected to the procedure for testing acid dyes, a considerable bleeding might take place into water-ammonia. But no redyeing of wool could be ac-

complished from this extract since it consists not of dyestuff but of by-products of the dyeing process, which were not removed because of insufficient rinsing prior to finishing.

2) In the second case, from a water dispersion of *very poorly soluble metal-dye complexes*, the dye complexes are exhausted from the dispersion onto the wool. Because of the poor solubility of these organo-metallic complexes in water, only small amounts of dyestuff can be extracted from a sample of a dyeing. Redyeing of wool from such an extract does take place, however, in distinction from chrome dyeings, but the shade is always much lighter than the original sample.

To differentiate further between chrome and dispersed metalized dyes, the difference in the active metal content is utilized.

Dispersed metalized dyes may contain in their ash either chromium, cobalt or manganese. When either of the last two metals is found, it immediately identifies class of dye since chrome color dyeings invariably contain chromium only. A dyeing produced with a neutral-dyeing chromium metalized dye always contain less chrome than chrome dyes.

The test is as follows:

Ash 20 mg of dyed sample in #000 porcelain crucible, add 500 mg of sodium carbonate-sodium nitrate mixture, fuse and examine after cooling to room temperature. If the color of the flux is yellowish, it was a chrome dye; if the flux is white, then it was a neutral-dyeing chromium metalized dye. The validity of the test is dependent, of course, on the positive test for chrome when a larger sample of this dyeing is used (300-500 mg).

G) VAT DYES———Place 200-300 mg of a dyed sample in a 35 cc test tube; add two and one-half cc of 10% caustic soda; raise to boil and keep it there until all of the wool is dissolved; and add 25-50 mgs of sodium hydrosulfite, 10-15 mg white cotton and 25-50 mgs of salt. Keep the test tube near boiling for one to two minutes, and then cool to room temperature. Remove the cotton, place on filter paper for one to two minutes, then in an oxidizing bath containing sodium nitrate and acetic acid.

Redyeing of the cotton indicates the presence of vat dyes.

In cases of very pale dyeing, the redyeing on cotton is too faint. Therefore, using the same piece of cotton, redye it in 2-3-4 successive solutions of 200-300 mg of the original dyeings.

Vat dyeings may contain chromium because of the industrial practice of reoxidation of vat dyeings with sodium dichromate. Presence of chromium in this case is of no consequence from the analytical point of view.

There is, however, a class of dyeing where indigo, or solubilized vat blue and the chrome colors are dyed on the same cloth. In this case, an analyst detects the coexistence of the two classes of dyes. The vat component can be redyed on cotton by the procedure given above, in which chrome dyes are destroyed. The vat component can be completely removed by repeated extractions with pyridine, leaving the chrome color intact on the sample.

H) LEUCO ESTERS———These are water-soluble, stable esters of vat dyes. On the wool fiber they are saponified and oxidized, producing a true vat color which can be identified as under (G).

I) NAPHTHOLS———These are water-insoluble azo dyes formed on the fiber *in situ*. Their presence on the sample is determined by exclusion of all other classes of dyestuff and by the property of naphthol dyeings to bleed freely in pyridine, to reduce in caustic soda solution of sodium hydrosulfite to a yellow or an orange shade incapable of reoxidation, and the characteristic spot tests with concentrated sulfuric acid.

The procedure for the identification of naphthol dyes is detailed under (K) of the section pertaining to cotton and rayon, Part I Group III.

III. DYES ON ACETATE FIBERS (ACETATE AND ARNEL)

Acetate fibers are differentiated by complete solubility in boiling acetone.

To differentiate between acetate and Arnel, immerse specimen in benzyl alcohol at 50°C. Acetate is completely dissolved, whereas heat-treated and nonheat-treated Arnel is virtually unaffected.

The following dyestuff classes are used in the dyeing of acetate fibers:

A) vat dyes
B) acid dyes
C) pigments
D) disperse (acetate) dyes, and
E) developed disperse dyes.

A) VAT DYES———Place a 100 to 300-mg sample of a dyeing in a 35-cc test tube, add one to two cc of 20% caustic soda solution and boil sample for one to two minutes. Add four to eight cc of water and 15-30 mgs of sodium hydrosulfite and boil for another one-half to one minute. Remove the sample and add a 25 to 50-mg piece of white cotton and 15-30 mg of salt; keep boiling for 40-80 seconds, then let it cool to room temperature. Remove the cotton and place it on filter paper to oxidize by air.

Redyeing of cotton by the above procedure to a shade differing only in strength from the original dyeing proves the presence of vat colors.

After vat dyes are excluded, the procedure for acid dyes and pigments is as follows:

Place a 100 to 300-mg sample in a 35-cc test tube, add five cc of 25% solution* of 2-methyl-N-pyrrolidone and immerse the test tube in a beaker containing water. Bring the water to a boil and in 20-40 seconds remove the test tube, discard the dyeing, and to the extract add three to five cc of toluene and 20-25 cc water. Shake the test tube well and observe.

* 25 cc 2-methyl-N-pyrrolidone
75 cc water
100 cc

B) ACID DYES———Water layer is strongly colored. The shade is the same as the original dyeing. Toluene layer is colorless.

C) PIGMENTS———Water layer is turbid (milky). Toluene layer may be colored or colorless depending on the type of pigment present.

The validity of the test for the remaining two classes depends on the previous exclusion of the first three. Procedure is the same as for acid dyes, but after discarding the sample, examine first the extract.

D) DISPERSE (ACETATE) DYES———1) The extract is colored the same shade as the original dyeings.

2) After addition of toluene and water, the toluene layer is strongly colored in a shade similar to the original dyeing. The water layer may be colorless or slightly tinted, usually different in shade than toluene layer.

E) DEVELOPED DISPERSE DYES———1) The extract is colorless or colored in a different shade than the original dyeing. It is usually a shade of brown, irrespective of the shade of the original sample.

2) Both layers are colored. In some cases, the toluene is stronger; in other cases, the water. The coloring is different in shade than the original dyeing and it is usually light brown.

When material proof is desired of the presence of disperse dyes, the toluene layer can be separated by means of a separatory funnel, washed with water, the toluene evaporated, and the residue dispersed in water

with a dispersing agent, such as Blancol, and redyed on white acetate fiber.

For obtaining material proof of the presence of acid dyes (negative redyeing on acetate and positive on wool fibers), extract the sample once more with 25% of N-methyl-2-pyrrolidone and free the extract from the methyl pyrrolidone by the technique described in Part IV, Group II, Ligroin Test.

Material proof of pigments and developed disperse dyes can be obtained only by a negative means, ie, failure to redye any fiber.

IV. DYES ON NYLON FIBERS (Nylon 66 from adipic acid; Nylon 6 from caprolactum)

Nylon fibers are differentiated from others by A) insolubility in acetone, and B) complete solubility in boiling 85% formic acid.

The following dyestuff classes are used in the dyeing of nylon:

A) vat dyes
B) disperse dyes
C) dispersed metalized dyes (neutral dyeing)
D) naphthol dyes
E) chrome dyes
F) soluble metalized dyes (acid dyeing)
G) direct dyes
H) basic dyes
I) acid dyes.

From the list above it is apparent that these dyes are the same as used on cotton, wool, or acetate rayon. Their identification, therefore, could be accomplished by the same means, provided the dyes could be removed in sufficient quantities from the dyed nylon. And here is the main difficulty: most nylon dyeings do not bleed in mediums from which redyeings and other identification proceedings could be made.

The problem of identification of dye classes on nylon is resolved into two parts:

I) Finding a medium in which nylon dyeings would bleed but which would not dissolve any appreciable quantity of nylon fiber.
II) Devising procedures for transferring dyes extracted from nylon dyeings into mediums from which redyeings and other means of identification could be accomplished.

It has been found that a satisfactory solution to Part I is obtained by a mixture of 8 parts of formic acid (85%) and 92 parts of N-methyl-2-pyrrolidone. All classes of dyestuffs bleed into this mixture in sufficient quantities to allow their identification. We will call this mixture of 8 parts formic acid (85%) in 92 parts N-methyl-2-pyrrolidone the "Nylon Reagent" in the following outline of the scheme for identification.

For satisfying Part II of the scheme for dye identification on nylon, we give a number of general tests which would differentiate between different classes of dyes used on nylon.

Bleeding Off Nylon Dyeing. Place a 200 to 300-mg sample of the dyeing in a 35-cc test tube, add 10-12 cc of "Nylon Reagent" and place the test tube into a beaker of boiling water. Keep it in the boiling water until a sufficient amount of dye has bled off. Remove the test tube from the beaker. Discard the dyeing and use the extract for the tests described below.

"Toluene Test". Pour two and one-half to five cc of the extracted dye into a 35-cc test tube, add 25 cc toluene and shake. Add one-half to one cc water, shake again, let it separate into two layers. The distribution of dyes between the two layers would be as follows:

Toluene Layer (Group I)
all naphthols
all vat dyes
all disperse dyes
some dispersed metalized (neutral-dyeing) dyes

Water Layer (Group II)
all acid dyes
all basic dyes
all direct dyes
all soluble metalized (acid-dyeing) dyes
all chrome dyes
some dispersed metalized (neutral-dyeing) dyes

Group I——Toluene Layer Dyes

A) VAT DYES———Transfer the content of the test tube (toluene and water) into a 60-cc separatory funnel (Fisher Cat #10-422). Draw off the water layer and wash the toluene with 20-25 cc water five or six times to remove most of the N-methyl-2-pyrrolidone. Filter the toluene through a dry filter paper into an evaporating dish #000. Evaporate the toluene on a water or steam bath. Dissolve the dry residue in three to six cc of five percent caustic soda to which was added five to 15 mg of sodium hydrosulfite. Transfer the solution into a test tube. A redyeing from the above solution on three to five mg of white cotton would prove the original shade was a vat dyeing.

Special care must be taken in extracting Brilliant Indigo. This dye is sensitive to heating with the "Nylon Reagent" and a prolonged heating destroys the color. Therefore, the extraction should be watched closely and the test tube removed from the water bath as soon as sufficient dye is extracted.

B) DISPERSE DYES———Pour another portion of the original extract from the dyeing into a 60-cc separatory funnel and add 10-15 cc toluene. Wash the toluene four to five times with 20 to 25-cc portions of water. Transfer the washed toluene into an evaporating dish and evaporate on a water or steam bath almost to dryness (a volume of one-half to one cc). Add to the residue one drop of a 10% water solution of a dispersing agent of the Blancol type and five to seven cc water. Transfer the dispersion into a test tube, add a 10 to 15 mg piece of acetate rayon and boil.

Redyeing of acetate rayon from the above dispersion proves the original dyeing was made with an acetate color.

C) METALIZED DYES———If the ash of the original dyeing contains chromium, cobalt or manganese, and in the "toluene test" the extract of the dyeing is in the toluene layer, then the original nylon dyeing was made with metalized neutral-dyeing acid colors of the Irgalan type (metalized dyes containing practically no water-solubilizing groups in the molecule).

D) NAPHTHOLS ——— Pour a third portion of the original extract into a 60-cc separatory funnel add 15-20 cc toluene. Wash the toluene twice with 10 to 15-cc portions of water. Transfer the washed toluene into an evaporting dish and evaporate to dryness.

Add to the dry residue five cc alcohol and one cc 10% caustic soda solution, warm if necessary, and transfer the contents to a test tube, add three to five cc of water and boil off the alcohol. Add 10-20 mg of sodium hydrosulfite and keep boiling until the azo dye is reduced, if necessary adding more sodium hydrosulfite and more caustic soda.

When the azo dye is reduced, add a five- to 10-mg piece of white cotton and 10-20 mgs salt. Boil the contents of the test tube for one to two minutes and allow to cool to room temperature.

Remove the cotton and place on a filter paper. The cotton is yellow in color if the original dyeing was made

with a naphthol AS series combination. Dry the cotton in the air and examine under a UV lamp: A characteristic yellow fluorescence of naphthol AS series would demonstrate further the presence of an insoluble azo dyestuff.

The presence of a naphthol dyeing can be confirmed also by exclusion of the other three members of the toluene layer group of dyes.

Group II——Water Layer Dyes

Ligroin Test. To five to six cc of a "Nylon Reagent" extract of the original dyeing add eight cc of Tetrahydrofuran (Eastman Kodak #5308), then 10 cc ligroin, shake, add ligroin in one-half-cc portions until the solution becomes turbid and tends to separate into layers. Then add Tetrahydrofuran in very small portions until the solution is homogeneous again. Add one-half cc ligroin. A turbidity should result and a colored layer separate at the bottom of the test tube. This colored layer should be between one-half and one and one-half cc in volume; if not, readjust the proportion between ligroin and Tetrahydrofuran to obtain this volume. Transfer the adjusted contents of the test tube to a 60-cc separatory funnel. Allow to separate into layers and draw off the colored layer into a test tube: Add three to five cc of water. Bring the contents of the test tube to boiling and burn off at the mouth of the test tube escaping vapors of ligroin and Tetrahydrofuran. Keep boiling until steam appears. This solution serves for the redyeing of different fibers for the purpose of differentiating the different classes of dyes in Group II.

Group II-A

Group II-A, Water Layer Dyes Containing Metals, includes the following: C) dispersed metalized dyes (neutral dyeing), E) chrome dyes, and F) soluble metalized dyes (acid dyeing). The ash of an original dyeing of these three classes of dyes contains chromium, cobalt or manganese.

C) DISPERSED METALIZED DYES (NEUTRAL DYEING)———

a) The ash contains cobalt, manganese or chromium. When cobalt is found the identification of this class of dyes is complete. When manganese is in the ash the absence of direct cotton dyes must be confirmed.
b) They bleed freely and profusely in "Nylon Reagent".
c) Redyeing on wool is of the same shade as the original dyeing.

E) CHROME DYES———

a) The ash contains chromium.
b) They bleed very slowly and sparsely in "Nylon Reagent", the bleeding in most cases is of a totally different color than the original dyeing.
c) Redyeing on wool gives a different color than the original dyeing.

F) SOLUBLE METALIZED DYES (ACID DYEING)———

a) The ash contains chromium.
b) They bleed slowly and sparsely in "Nylon Reagent". The bleeding is, however, the same color as the original dyeing.
c) Redyeing on wool gives the shade of the original dyeing.

Group II-B

Group II-B includes water layer dyes containing no metals, including direct cotton dyes, basic dyes, and acid dyes.

G) DIRECT COTTON DYES———To the final extract* from the "Ligroin Test" add a piece of cotton, five to 10 mg of common salt, and a drop of concentrated ammonia. Boil for one to two minutes and cool to room temperature. If the cotton is redyed to near the original shade, this would be proof of direct cotton dyestuff.

H) BASIC DYES———To the final extract from the "Ligroin Test" add a drop or two of 10% acetic acid and a two- to five-mg thread of tannin-mordanted cotton and boil. Basic dyes would exhaust on tannin-mordanted cotton.

I) ACID DYES———To the final extract* from the "Ligroin Test" add three to four drops of 10% acetic acid and a five- to 10-mg piece of wool. Boil for a minute or so. Acid dyes would exhaust on wool producing a shade comparable with the original dyeing.

*The extract from which ligroin and Tetrahydrofuran were boiled off.

V. DYES ON ACRYLIC FIBERS (ACRILAN, DYNEL, ORLON)

Acrylic fibers are differentiated from others by A) insolubility in boiling 85 formic acid**, B) insolubility in boiling ortho cresol***, and C) complete solubility in boiling N-methyl-2-pyrrolidone.

**Some acrylics shrink in this solvent, some disintegrate, but all keep their fibrous structure.
***Dynel changes to a plastic mass.

The following dyestuff classes are used in the dyeing of acrylic fibers:

A) disperse (acetate) dyes
B) neutral-dyeing metalized acid dyes
C) basic dyes
D) acid dyes
E) chrome dyes.

Bleeding-off Acrylic Fiber Dyeings. Place a 200 to 300-mg sample in a 35-cc test tube, add two cc of 40% aqueous solution of N-methyl-2-pyrrolidone. Place the test tube in a beaker of boiling water and keep it there for 10-20 minutes or until a sufficient amount of dye has bled into the reagent.

Remove the test tube from the water bath. Discard the sample.

Separation of Acrylic Fiber Dyes in Two Groups.

"Toluene Test". Pour the extract obtained by the above treatment into a 15-cc test tube containing 10 cc toluene. Shake, add one cc water, and shake again. Let the test tube stand until two layers are well separated, then the distribution of dyes in the two layers would be as follows:

Toluene Layer (Group I)

A) all disperse dyes
B) some dispersed metalized dyes (neutral-dyeing, of Irgalan type)

Water Layer (Group II)

C) all basic dyes
D) all acid dyes
E) all chrome dyes
F) some dispersed metalized dyes (neutral-dyeing, of Cibalan type)

Group I

This group is composed of only two classes of dyes: disperse dyes and neutral-dyeing metalized acid dyes which contain no or minimum water-solubilizing groups in their molecules.

The presence of chromium, cobalt or manganese in the ash of the original dyeings differentiates these metalized dyes from the disperse dyes, the ash of which contains no heavy metals.

For a confirmatory test, the toluene layer can be separated by means of a 60-cc separatory funnel, washed with water and evaporated. The residue is dispersed with a drop of 10% water solution of Blancol. A redyeing on wool or acetate rayon could be produced.

Metalized dyes would go on wool only.

Disperse dyes would go both on wool and on acetate rayon but acetate rayon is usually dyed heavier.

Group II

C) BASIC DYES———Add two cc of 10% caustic soda solution to the 15-cc test tube from "Toluene Test". Place this test tube into a beaker of boiling water for a few minutes. Remove the test tube, cool, shake, and allow the two layers to separate.

Decant a good portion of the toluene layer into a 10-cc test tube. Add one-eight to one-quarter cc of 10% acetic acid, shake well, and allow to settle.

A basic dye would color the bottom, acid layer in the shade of the original dyeing.

D) ACID DYES———The ash of the original dyeing contains no heavy metal, and basic dyes have been excluded.

B) METALIZED NEUTRAL DYEING ACID DYES and E) CHROME DYES———The ash of the original dyeing contains cobalt, manganese or chrome.

When cobalt or manganese are found, the dyeing was made with metalized neutral-dyeing acid dyes.

When chromium is found, the differentiation between the two classes can be accomplished by quantitative test for chrome as given in the procedures under wool, Part II, Sections E and F.

Remarks. There are a few basic dyes, the unusual behavior of which may cause a misinterpretation of the results of the "Toluene Test".

These dyes are of the Chrysoidine and Bismark Brown class. They are used mostly for compounding black shades.

Their unusual behavior consists of:

a) coloring toluene layer in the "Toluene Test", and

b) having strong affinity for acetate rayon.

Therefore, when analyzing a black shade and finding that its main constituents are basic dyes, one should not look for a disperse color as a component of this black dye but ascribe the yellow coloring of toluene to the presence of Chrysoidine or Bismark Brown.

VI. DYES ON DACRON POLYESTER FIBER

Dacron polyester fiber is differentiated from others by: A) insolubility in boiling 85% formic acid, B) complete solubility in boiling ortho cresol, and C) complete solubility in boiling N-methyl-2-pyrrolidone.

Dyestuff Used for Dacron. Disperse dyes are the only class which have, until quite recently, been used for dyeing Dacron. Consequently, the very identification of the fiber serves for the identification of the dyes used on this fiber.

However, during 1957, there appeared on the market samples of Dacron blacks, navies, and dark browns, which had been produced with developed disperse dyes, such as the Cellitazols, thus introducing a second class of dyes which can be used on Dacron.

The following method would differentiate between these two classes and possibly others which may be introduced in the future.

Place one and one-half to two g resorcinol in a 35-cc test tube, drop on top of the resorcinol a 50 to 100-mg sample of the dyeing. Warm the test tube carefully over a Bunsen burner to melt the resorcinol.

When the latter is liquid, keep shaking the test tube, warming it now and then, if necessary, until the sample is completely dissolved and, then, let the test tube cool to room temperature. In order to facilitate further steps in the analysis, avoid solidification of the resorcinol melt at the bottom of the tube, but spread it along the sides by rotating the test tube in an inclined position while the melt is solidifying.

Extract the resorcinol melt with 10-15 cc of ether; use a glass rod to break any lumps of the melt. Filter the extract through a 7-cm filter paper into another 35-cc test tube.

A) When the residue from the filtration (the reprecipitated Dacron fiber) is white or very lightly colored, disperse dyes were used.

B) When this residue has a definite, rather dark color, the dyes used on the sample were developed disperse dyes.

Material Proof of the Presence of Disperse Dyes. Evaporate the ether from the filtrate of the ether extract. Add to the test tube 20-25 cc water to dissolve the resorcinol, and three to five cc of chloroform to extract the dyestuff. Shake the test tube and transfer the contents into a 30 to 60-cc separatory funnel, add more water. Draw off the colored bottom layer of chloroform into a third 35-cc test tube. Add one to two drops of 10% water (three to six cc). Disperse the the Blancol type and one-half to one cc of water. Place the test tube on a steam or water bath, and when the chloroform is evaporated, add more water (three to six cc). Disperse the dye by boiling, then add a 25 to 50-mg piece of white acetate. The re-dyeing of the acetate is proof of the presence of disperse dyes.

Developed disperse dyes, under the above conditions, might slightly stain white acetate but would not dye it.

AATCC Calendar

COUNCIL
Jan 24 (Hotel Statler, New York, NY); May 23 (Philadelphia, Pa); Sept 19, 1958 (Charlotte, NC)

NATIONAL CONVENTIONS
Oct 30-Nov 1, 1958 (Hotel Conrad Hilton, Chicago); Oct 8-10, 1959 (Sheraton Park and Shoreham Hotels, Washington, DC); Oct 6-8, 1960 (Sheraton Hotel, Philadelphia, Pa); September 28-30, 1961 (Buffalo, NY)

HUDSON-MOHAWK SECTION
Jan 24 (Albany, NY); Mar 28 (Johnstown, NY area); May 16 (Ladies Night); June 20 (Summer outing)

METROPOLITAN SECTION
Feb 7 (New York, NY); April 11 (New Jersey area)

MID-WEST SECTION
Feb 15 (Hotel Bismarck, Chicago, Ill); April 19 (Netherland Hilton Hotel, Cincinnati, O); June 13-14 (Outing—Browns Lake Resort, Burlington, Wis)

NIAGARA FRONTIER SECTION
Feb 21 (Buffalo); Apr 4 (Joint meeting)

PIEDMONT SECTION
Jan 24-25 (Clemson House, Clemson, SC); Apr 25-26 (Washington Duke Hotel, Durham, NC); June 6-8 (Outing—Grove Park Inn, Asheville, NC); Sept 19-20 (Hotel Charlotte, Charlotte, NC)

SOUTHEASTERN SECTION
Feb 15 (Hotel General Forest, Rome, Ga)

Now Available . . . .

Proceedings of the Perkin Centennial

containing all of the papers presented during the Perkin Centennial held in New York during the week of September 10th, 1956.

468 pages
$10.00 postpaid

Send orders to
National Headquarters
American Association of Textile Chemists and Colorists, PO Box 28, Lowell, Massachusetts

MEMBERSHIP APPLICATIONS

SENIOR

William L Acree—Chemist, Fair Lawn-Richmond Finishing Co, Fair Lawn, NJ. Sponsors: W G Helmus, H Moore. (Met).

John C Anderson—Supt, dye & finish, Groves Thread Co, Inc, Gastonia, NC. Sponsors: J E Jones, R E Rupp. (P).

Peter A Arsenault—General foreman, Chicopee Mfg Corp, Chicopee, Mass. Sponsors: J W Byam, S A Simon. (WNE).

Frank L Baker, Jr—Sample dyer, Collins & Aikman Corp, Albemarle, NC. Sponsors: W D Hathcock, D S Hasty. (P).

Earl W Boles — Supervisor, Dye Dept, Dixie Mercerizing Co, Chattanooga, Tenn. Sponsors: O L Masingill, W S Lowery. (SC).

Joseph D Brummitt — Lab tech, Mooresville Mills, Div of Burlington Industries, Mooresville, NC. Sponsors: V C Smith, C R Neal. (P).

William B Bushnell—Textile technologist, Quartermaster Research & Engineering Ctr, Natick, Mass. Sponsors: N S Buchan, A M Campbell. (NNE).

Joseph L Butt—Supt, Finishing Div, Chicopee Mfg Corp, Chicopee Falls, Mass. Sponsors: J W Byam, S A Simon. (NNE).

Stanislaw N Chrzanowski—Textile chemist, Color-knit Dye Corp, Elizabeth, NJ. Sponsors: J B Young, I P Mintz. (Met).

Thomas F Cullen—Lab tech, Jos Bancroft & Sons Co, Rockford, Wilmington, Del. Sponsors: H R Hushebeck, R S Babiarz. (DV).

Edward F Hayes — Executive vice pres, Riggs & Lombard, Inc, Lowell, Mass. Sponsors: G O Linberg, G P Paine. (NNE).

Jaime H Gallon—Boss dyer, Sudamtex of Venezuela, Venezuela. Sponsors: V O Lopez, L R Jaramillo.

Basil S Higham—Dyehouse mgr, H B Dickie Ltd, Melbourne, Australia. Sponsors: F Roff, F Hanserman.

Marion W Hodges, Jr — Sales trainee, Sandoz, Inc, New York, NY. Sponsors: C H A Schmitt, H A Weil. (Met).

Stuart I Hunter — Lab director, Wamsutta Mills, New Bedford, Mass. Sponsors: G O Linberg, G P Paine. (NNE).

Edwin F Landis—Lab mgr, Geigy Dyestuff Corp, Charlotte, NC. Sponsors: J B Foster Jr, R A Link Jr. (P).

William R MacIntyre—Asst to the president, Jos Bancroft & Sons Co, Wilmington, Del. Sponsors: R C Squier, J Christie. (DV).

Gunther Malue—Dyer, Geo Pattinson & Co Ltd, Preston, Ont, Canada. Sponsors: N J Mohoruk, K A Lister. (NF).

Laurence W Mazzeno — Chemist, Southern Regional Research Laboratory, New Orleans, La. Sponsors: F L Perkerson, W N Berard. (S).

Paul K Minta—Head chemist, Kenyon Piece Dyeworks, Inc, Kenyon, RI. Sponsors: F C Kinch, J W Timperley. (RI).

Fred D Noblett — General mgr, Beaunit Mills, Inc, New York, NY. Sponsors: J Balloch, J Rogers. (P).

Edmund H Piltz—Asst supt, Finishing Div, Associated Textiles of Canada, Louiseville, Que, Canada. Sponsors: S Greaves, F Stubbings.

Roland E Richards—Supt of Finishing Dept, Kenyon Piece Dyeworks, Kenyon, RI. Sponsors: F C Kinch, J W Timperley. (RI).

Edward Robbart—Consultant, Collins & Aikman Corp, New York, NY. Sponsors: J Bauer, G A Heath. (NNE).

John M Robinson—Dyehouse shift overseer, Piedmont Processing Co, Belmont, NC. Sponsors: F E Stuart, H J Jordan Jr. (P).

Charles W Shain—Proc Div supv, Eureka Printing Co, Clifton, NJ. Sponsors: I P Mintz, J B Young. (Met).

Emory Sherrer—Tech service, dyes and chemicals, E I duPont de Nemours & Co, Inc, Charlotte, NC. Sponsors: H H Field, J K Kilheffer. (P).

William Sherrill—Dyehouse shift overseer, Piedmont Processing Co, Belmont, NC. Sponsors: F E Stuart, H J Jordan Jr. (P).

Robert Swedeker — Color chemist, Bakelite Co, Bound Brook, NJ. Sponsors: V J Houska, F C Dexter. (Met).

Romulus H Upton—Dyehouse shift overseer, Piedmont Processing Co, Belmont, NC. Sponsors: F E Stuart, H J Jordan Jr. (P).

Arturs Vatvars—Chemist, Jos Bancroft & Sons Co, Wilmington, Del. Sponsors: H R Hushebeck, J Christie. (DV).

Isaiah Von—Section chief chemist, Dyes Dept, American Cyanamid Co, Bound Brook, NJ, Sponsors: W J Moran, J A McSheehy. (Met).

George D Webster—Tech sales rep, Verona Dyestuffs, Union, NJ. Sponsors: V B Wright Jr, J M Myers. (P).

Albert H Welle—Tech rep, Union Carbide Chemicals Co, Needham Heights, Mass. Sponsors; R Zametkin, G O Linberg. (RI).

Charles E Wells—Supt package mach, warp bleaching, Dixie Mercerizing Co, Chattanooga, Tenn. Sponsors: W G Agnew, O L Masingill. (SC).

Howard J White Jr—Director of research, Textile Research Inst, Princeton, NJ. Sponsors: J R Bonnar, R R Frey. (Met).

Edwin H Wolfe—Asst mgr, textile, paper & leather chem, General Aniline & Film Corp, New York, NY. Sponsors: W R Brandt, C Z Draves. (Met).

Angelo Zappa—Supt of dye & finish, Textilose Textiles in Varano Borgi, Italy. Sponsors: S M Dadone, L F Olsen.

ASSOCIATE

Anthony J Almo—Color shop foreman, Classic Silk Printers, Inc, Brooklyn, NY. (Met).

Juan Cerva—Pres & owner, Cerva y Larrain Ltda, Casilla, Santiago, Chile.

Suk W Choi—Color tech, Tongyang Silk & Dye Co, Ltd, Korea. (NNE).

Sheldon N Epstein—Chief chemist, Advance Piece Dye Works, Rutherford, NJ. (Met).

John Lewis—Salesman, John D Lewis branch of McKesson & Robbins, Providence, RI. (RI).

Rocco R Pangallo—Supt of dyehouse, Scalamandre Silk Inc, Long Island City, NY. (Met).

William Shields — General mgr, Long Finishing Mills, Inc, Burlington, NC. (P).

Peter Smith—Plant mgr & supt, Sunset Line & Twine Co, Florence, Ala. (S).

Alan Symonds—Purchasing agent, Quincy Dye Works, Inc, Woonsocket, RI. (RI).

Richard Turner—Sales rep, Olin Mathieson Chem Corp, Charlotte, NC. (P).

Robert Zabriskie — Merchandise mgr, Woodward, Baldwin & Co, Inc, New York, NY. (Met).

JUNIOR

Joseph Geraghty—Lab technician, Ludlow Mfg & Sales Co, Needham Heights, Mass. Sponsors: R F Goodwin, W B Kaupin. (NNE).

William Healey—Lab technician, Ludlow Mfg & Sales Co, Needham Heights, Mass. Sponsors: A G Hoyle, W B Kaupin. (NNE).

Richard Montanaro—Lab technician, Ciba Co, Inc, Rumford, RI. Sponsors: H X deRedon, A Rodenhaven. (RI).

John Nettles—Lab supervisor, Altavista Plant, Burlington Industries, Altavista, Va. Sponsors: J P Franklin, S G Williams. (P).

Sidney Sands—Sales engineer, The Foxboro Co, Foxboro, Mass. Sponsors:: W H Ridley, J W Gordon. (NNE).

Howard Sprock Jr—Lab technician, Geigy Dyestuff Corp, Ardsley, NY. Sponsors: S Mooradian, R C Allison. (Met).

Anthony Wall—Asst supt, Nicetown Dye Works, Philadelphia, Pa. Sponsors: P de St Phalle, J G Kilroy. (DV).

William Wall—Salesman, Nicetown Dye Works, Philadelphia, Pa. Sponsors: P de St Phalle, J G Kilroy. (DV).

STUDENT

Gerald Allen, Dwight Carlisle, Marion Hayes, William Lanes, Eugene Robbins, and Richmond Terry—Students, Alabama Polytechnic Institute, Auburn, Ala. Sponsor: J H Cox. (API).

Pedro Barcelo—Student, Escuela Industrial de Peritos, Spain. Sponsor: C M Gilbert.

Arthur Canuel, Francis Donahue, Robert Hart, Raymond McGarty, J Morganstein, J M Pollard Jr, John Simoes, and Edward Thomas—Students, Bradford Durfee College of Technology, Fall River, Mass. Sponsor: J Watters. (D).

Ronald Charves, Robert Robinson, and Bahjat Yousif—Students, New Bedford Institute of Technology, New Bedford, Mass. Sponsor: F Tripp. (NB).

S Kapashi, K M Mathew, and Mark Schiff—Students, North Carolina State College, Raleigh, NC. Sponsor: H A Rutherford. (NC).

Reginald Marchand—Student, St Hyacinthe Textile School, St Hyacinthe, Canada. Sponsor: G R Boule.

Tolen Mitchell—Student, Georgia Institute of Technology, Atlanta, Ga. Sponsor: W Postman. (G).

Patricia O'Malley—Student, Univ of Tennessee, Knoxville, Tenn. Sponsor: E J Rock. (SC).

Margaret Stevens—Student, Purdue Univ, Lafayette, Ind. Sponsor: R W Padgett. (MW).

Toshio Yasuzawa—Student, Lowell Technological Institute, Lowell, Mass. Sponsor: G R Griffin. (LTI).

ACTIVITIES OF THE LOCAL SECTIONS

Northern New England

AT THE Annual Meeting of the Northern New England Section, held Dec 6th at the Hotel Vendome, Boston, Mass the following officers were elected for 1958: *Chairman*—Edward B Bell, Textile Aniline and Chemical Co; *Vice chairman*—Robert D Robinson, Bachmann Uxbridge Corp; *Secretary*—Azel W Mack, Dexter Chemical Corp; *Treasurer*—William W Pennock, E I duPont de Nemours & Co, Inc.

National Councilors elected were Philip S Durfee, W C Durfee Co; John J Healy, Gonic Mfg Co; and Frank J Rizzo, Quartermaster Research and Engineering Command.

Elected to the Sectional Committee were Walter E Flister, Barre Wool Combing Co, Ltd; Fritz F Kobayashi, Lowell Technological Institute; Robert J Peirent, Lowell Technological Institute; and Hans G Walz, Sagamore Color and Chemical Co.

The Sections' Ralph E Hale Scholarship was presented to George A Lyna, Class of 1958, Lowell Technological Institute.

The technical session was prepared by Mr Robinson. Henry E Millson, manager of the Technical Laboratory, Dyes Dept. Organic Chemical Div, American Cyanamid Co, presented a lecture on the subject "Some Factors which Influence the Lightfastness of Colored Materials."

John R Markgren, W C Durfee Co, made the dinner arrangements.

NNE ANNUAL MEETING—Elected officers for 1958 and other principals in attendance at the Northern New England Section's Annual Meeting on Dec 6:

Front (l to r): Edward B Bell, Textile Aniline & Chemical Co, chairman; William W Pennock, E I duPont de Nemours & Co, Inc, treasurer; John R Markgren, W C Durfee Co, dining chairmen; Frank J Rizzo, Quartermaster Research & Engineering Command, Councilor; George O Linberg, Synthron, Inc, AATCC president; Fritz F Kobayashi, Lowell Technological Institute, sectional committeemen.

Rear (l to r): Ernest R Kaswell, Fabric Research Laboratories, Inc, AATCC vice president; Hans G Walz, Sagamore Color & Chemical Co, sectional committeeman; Henry E Millson, American Cyanamid Co, guest speaker; Robert D Robinson, Bachmann Uxbridge Worsted Corp, vice chairman; Azel W Mack, Dexter Chemical Corp, secretary; Philip S Durfee, W C Durfee Co, Councilor.

Washington

THE Washington Section has re-elected its entire slate of officers for 1958 as follows: *Chairman*—George P Fulton, National Institute of Drycleaning; *Vice chairman*—Arnold M Sookne, Harris Research Laboratories; *Secretary*—Nelson F Getchell, National Cotton Council; *Treasurer*—Louis R Mizell, Harris Research Laboratories; *Councilor*—Lawrence L Heffner, Wm F Hooper & Sons Co; *Sectional Committee*—Gordon Barber, Young Aniline Works; Paul Marsh, USDA; Dorothy Nickerson, USDA; and Thomas W Shoesmith, Amerotron Clarksville Finishing Plant.

Guest speaker at the Section's December 3rd meeting was Henry E Millson, American Cyanamid Co, who discussed "Microscopic Studies of Textile Fibers."

Southeastern

THE Southeastern Section held its 1957 annual meeting at the Atlanta Biltmore, Atlanta, Ga, on December 7, with George L Dozier, Southern Dyestuff Co, sectional committeeman in charge. Some 90 members and wives of members were in attendance.

At the technical session, M B Eubanks, director of purchases and transportation, Riegel Textile Corp, presented a talk, "Three Sides to the Public Relations Triangle," in which he discussed the interrelated functions of purchasing, sales, and customer service.

At the evening banquet, which followed a Social Hour, Paula Stevenson, first coed to study textile chemistry at Georgia Tech, expressed her gratitude to the Section for the scholarship which has made it possible for her to complete her studies in 1958.

SOUTHEASTERN SECTION OFFICIALS FOR 1958—Seated (l to r): A Kempton Haynes, Rohm & Haas Co, custodian; William B Amos, Jefferson Mills, treasurer; William B Griffin, Dexter Chemical Corp, chairman; Robert B Hallowell, Coats & Clark, vice chairman; Warren E Tiller, Tennessee Corp, secretary.

Standing (l to r): H Gillespie Smith, American Cyanamid Co, AATCC vice president; Nesbit Johnson, Geigy Chemical Corp, sectional committeeman; William E Fayssoux, Royce Chemical Co, councilor; Valentine Winkelman, Russell Mfg Co, sectional committeeman; Frank Cooper, Dixie Belle Co, sectional committeeman; John C Cook, W R C Smith Publishing Co, publicity chairman.

T Howard McCamy, Seydel-Woolley & Co, councilor, was not present when photo was taken.

Curt Mueller, Bibb Mfg Co, presents Southeastern Section's 1958 Scholarship Award to Paula Stevenson, a textile chemistry and dyeing student at Georgia Institute of Technology.

Chairman William B Griffin presented a check, representing 3rd prize in the 1957 Intersectional Contest, to Paul Seydel, chairman of the Section's 1957 Intersectional Contest Committee. The Committee's paper, "Metallic Contamination in Peroxide Bleaching," was presented at the recent Boston Convention.

Featured speaker at the banquet was Leo Aikman, feature writer for the *Atlanta Constitution*, who spoke on "The You in Automation."

The following officers will serve the Section in 1958: *Chairman*—William B Griffin; *Vice chairman*—Robert B Hallowell; *Secretary*—Warren E Tiller; *Treasurer*—William B Amos; *Councilors*—William E Fayssoux and T Howard McCamy; *Sectional Committeemen*—Frank Cooper, Nesbit Johnson, Leon Tigler, and Valentine Winkelman; *Custodian*—A Kempton Haynes.

Southeastern Section Chairman William B Griffin, Dexter Chemical Corp, presents check representing 3rd prize award for the 1957 Intersectional Contest to Paul Seydel, Seydel-Woolley & Co, chairman of the Section's 1957 Intersectional Contest Committee.

M B Eubanks, director of purchases and transportation, Riegel Textile Corp, who spoke on "Three Sides to the Public Relations Triangle."

Leo Aikman, feature writer, *Atlanta Constitution*, who discussed, "The You in Automation."

ELECTED TO MEMBERSHIP

SENIOR

John Boyd	M B Rothman
Mary E Carter	Max Taitel
Walter Lakusta	B B Williams
Clarke A Rodman	L F Zayas

ASSOCIATE

George R Adams

JUNIOR

Harvey Herman

TRANSFER TO SENIOR MEMBERSHIP

Chester Dziadzio Donald J Latta

Abstracts

The Use of Colorants as Drugs and in Drugs

Cooper, J, "Proceedings of the Perkin Centennial," 95-7.

The discovery of the first synthetic aniline dye and the founding of the important dyestuff industry brought into being a new and spectacular variety of dyes with valuable pharmaceutical properties. These new substances were reliable, stable and compatible with most therapeutic agents. In addition, their highly selective staining and adsorptive properties quickly interested medical researchers who soon found many of them to be useful drugs.

The following products are among the ones which are currently listed as official drugs in the U S Pharmacopoeia:

Congo Red USP has many medical uses, including application in the treatment of infectious rheumatism and as an antitoxin against diphtheria.

Scarlet Red NF is used in the treatment of chronic ulcers and burns, and for surgical repair.

Evans Blue USP is employed as a diagnostic agent to estimate the volume of blood in a patient.

Acriflavine NF, an acridine dye, and its hydrochloride salt, are used as topical antibacterial agents.

Proflavine Hemisulphate BP, another acridine dye, is used as an antiseptic and reported to be less irritating and toxic than Acriflavine.

Aminacrine Hydrochloride BP, still another acridine, is widely used in Great Britain as an antiseptic against hemolytic staphylococci and other infections.

Fluorescein Sodium USP is a diagnostic agent, used in medicine and surgery, particularly in treatment of the eye.

Merbromin NF (Mercurochrome) is well-known as an antibacterial agent employed in the treatment of small wounds.

Iodophthalein Sodium USP is used in gall-bladder treatment to visualize that organ on an x-ray plate.

Phenolsulfonphthalein USP is employed to test the functional capacity of the kidneys.

Sulfobromophthalein Sodium USP is similarly used as a test for the functional capacity of the liver.

Gentian Violet is an important antibacterial and antifungal substance. It is prescribed for treatment of skin infections, burns, ulcers, etc, and taken orally to treat pinworm.

Basic Fuchsin NF is an antifungal remedy for athlete's foot and ringworm.

Methylene Blue NF was the first dye to be used as an antiseptic. It is widely used as a stain.

The author also discusses the coloring of food, drugs and cosmetics by coal-tar dyes. Under the Food & Drug Act of June 25, 1938, dyes intended for these purposes must be certified by the Government as harmless. At the present time, only 16 dyes are permitted to be used for coloring foods, 68 for coloring drugs and cosmetics, and 33 for use in drugs and cosmetics intended only for application to the skin. All dyes in these categories must be tested in Washington before certification is granted.—WHC

Development of Creslan Acrylic Fiber

Bendigo, C W, *Can Textile J* 74, 65-6, Oct 18, 1957.

The author points out that American Cyanamid Co's objective in the development of Creslan was to create a fiber of outstanding dyeability while retaining other important properties. He states that it can be dyed successfully with disperse, basic, neutral milling, neutral and acid metallized. acid, chrome and direct dyes. A table is included, giving data regarding the fastness to light, perspiration. washing and crocking of dyeings made with these eight classes of dyes.

Fabrics composed of 50% Creslan and 50% wool may be piece-dyed to give either cross-dyeings or solid effects.

The fiber is said to process well on equipment that has been found satisfactory for other acrylic fibers.

In addition to superior dyeability, Creslan has a number of useful physical properties, including high strength, light weight, wrinkle resistance. resilience, washability, dimensional stability, resistance to moths, mildew and flame, and the ability to be durably creased or plaited.

Production of these new fibers is in the pilot-plant stage at present. Full-scale production is expected late in 1958.—WHC.

Pleats in Their Right Places

Anon, *Dyer* 118, 743-4, Nov 8, 1957.

A process which is claimed to preserve a knife-edge crease in wool trousers and crisp pleats in wool skirts has been announced in Australia.

The method consists of spraying a weak solution of thioglycollic acid on to the garment, and then immediately steam-pressing for a short period.

It is said that wetting by rain, spray from a hose-pipe, or even prolonged immersion in water will not spoil the creases or pleats. They are not affected by commercial drycleaning, and show greatly improved durability in normal wear.

The proponents of the process, Commonwealth Scientific and Industrial Research Organization, of Geelong, state that strength measurements, abrasion tests and wearing trials on treated fabrics have shown that the physical properties are unimpaired; the hand is also unaffected.

In general, a solution containing 1% thioglycollic acid (75%), 1% ammonia and 0.1-0.2% wetting agent (eg, Teepol) gives satisfactory results. The pH of this solution is about 7.

The author gives full instructions for applying this solution. All-plastic spray guns must be used, and the solution should be mixed and stored in nonmetallic vessels, since thioglycollic acid reacts with iron and some other metals. Furthermore, spraying must be carried out in a well-ventilated area equipped with an exhaust fan.—WHC.

The Development and Use of Glass Fibers

Davies, A H, *Dyer* 117, 551-4, Mar 29, 1957.

The world output of glass fibers last year, according to the author, was more than a half-million tons.

Glass fibers used today vary in diameter from eight thousandths of an inch (used for air filters) to three thousandths of an inch in the very lightest insulation, which is fixed inside the skin of airliners to protect the passengers from cold and noise.

Glass wool, which accounts for most of the tonnage, has fibers about two inches long. By contrast, continuous filament fibers are ten miles long.

The tensile strength of a freshly drawn glass fiber is of the order of 200 tons per square inch—about the same as steel piano wire. Although this great strength is soon diminished through exposure and handling, commercial glass yarn is still stronger than ordinary steel.

The low specific gravity of glass, which is about the same as that of aluminum, gives glass fibers a strength-for-weight ratio which is the highest of any known material.

Fine glass yarns still find their most important outlets in the electrical industry, but there are two other main uses for glass cloth. The reinforcement of plastics is likely to become in time the most important outlet. Glass-reinforced plastics are extremely strong and also extremely light. Among present uses for these products are in roof panels, electroplating tanks, various military articles, boats, airplanes and commercial vehicles. The author states that something like 2000 boats have been molded in England to date.

The other important outlet for glass fibers is in the decorative market (eg, furnishing fabrics and draperies), where total safety against fire and easy washing are desired.

The author predicts that by 1976 entire railway coaches and buses will be made of reinforced plastics.—WHC

Dyes for the Hydrophobic Fibers

Schroeder, H E and Boyd, S N, "Proceedings of the Perkin Centennial," 357-367.

Until the advent of the new synthetic fibers, dyeing involved almost exclusively water-soluble colors. These colors dyed by a process of absorption where the fiber and dye showed an attraction, or affinity, for each other. The chemical reactions involved either salt formation between dye ions and ionized fiber, as in the case of wool, or intermolecular associations, as in the case of cellulose.

With the new fibers, first acetate, then the nylon polyamides, the acrylics, and the polyesters, a new approach to the dyeing problem was necessary. These new fibers as a class absorb considerably less water than the older fibers, and are less permeable to polar molecules. They are not easily colored with ionic dyes.

The disperse dyes, brought out originally for acetate dyeing, usually lack ionic solubilizing groups, and are applied from an aqueous dispersion. Acetate and polyester fibers are dyed with these products by a process involving solution of the dye in the fiber. A good disperse dye should have high solubility in the fiber and low solubility in water.

The authors present the structural formulas of a number of acetate dyes, and show how the addition of certain groups increases the affinity for the polyester fibers, while other groups increase the affinity for acetate. The relation between the fastness to water, light, sublimation and gas fading of these dyes and their chemical constitution is shown.

The acrylic fibers (Orlon, Dynel, and Acrilan) present a different problem. Orlon, for example, can be dyed with disperse dyes, but only light to medium shades are obtainable. To dye the acrylics with wool dyes requires the insertion in the polyacrylonitrile molecule of specific cationic sites with which dye anions may form salts. This may be accomplished 1) by copolymerization of acrylonitrile with a basic monomer (eg, vinyl pyridine), 2) by the use of cuprous ions.

The use of cationic (basic) dyes on Orlon and Acrilan has become extremely popular. A number of new cationic dyes have been produced, possessing improved fastness properties. The chemistry of these products is described.

The authors submit the following summary:

Disperse dyes are used on all fibers. They are the only practical dyes for acetate, triacetate and Dacron, and provide excellent fastness on the latter two. The disperse dyes are used on the acrylic fibers for light shades of exceptional wash- and lightfastness. On nylon they afford clear level shades but are generally deficient in both wet- and lightfastness. The acid dyes are used on the acrylic fibers and nylon, where they give acceptable fastness at reasonable cost. Cationic dyes are exceptionally valuable on Orlon and Acrilan, giving economy, brilliance and fastness.—WHC

• PATENT DIGEST •

PAUL WENGRAF

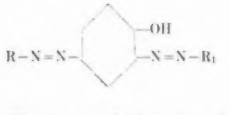
DYEING NYLON WITH METALLIZABLE AZO DYES ———in Presence of Copper Salts and Complex-Forming Organic Acids C,4,07

Brit Pat 765,080 (Sandoz Ltd—Jan 2, 1957)

Difficulties in the level-dyeing of nylon (or Perlon) fabrics have been experienced, particularly in dyeing with water-soluble azodyes containing complex-bound metals. Unequally stretched fibers in warp and filling are responsible for streaky dyeing results by reason of the great sensitivity of the above dyes to fibers produced under different tension conditions.

Uniform dyeings with the water-soluble dyestuffs of the aforementioned group can be obtained, according to the current invention, by dyeing the metallizable monoazo or diazo dyestuffs in the presence of a copper salt, a salt of an organic complex-forming acid and a noncaustic alkali.

Dyestuffs to be used in the present method are described in Brit Pat 723,-632. The general formula is;



wherein R is a radicle of a diazotizable component and R′, a radicle of the coupling component. The formula shows the position of the metallizable OH-group.

Salts of bivalent copper, such as sulfate, formate or acetate, are suitable. Organic acids capable of metal-complex formation are, among others, tartaric, citric, lactic or salicylic acids. Examples of the noncaustic alkali are sodium carbonate or potassium carbonate.

The polyamide fibers preferably are dyed in closed receptacles to maintain the appropriate temperature constant. The dyebath should be prepared first by adding a nonionic assistant of the alkylpolyglycol ether type to the dye. The goods are charged into the bath while the other above-mentioned ingredients are added gradually. Dyeing is effected in a weakly acid medium preferably in the presence of an ammonium salt.

Example: A dyebath was prepared with one of the above dyes and the nonionic assistant. 10% copper sulfate, 10% sodium citrate, and 5% sodium carbonate were added and the bath warmed to 75 C. A nylon fabric was dyed in this solution in a jig by passing it twice at 75 C; then raising the temperature to 85° and then to 95° C, adding further copper sulfate, sodium citrate and soda ash; and finally adding ammonium sulfate and continuing the dyeing at 95-100 C. Level dyeings of excellent fastness to light, washing and perspiration reportedly resulted.

DURABLE CALENDAR EFFECTS———Nonvolatile Acetals Applied G,4

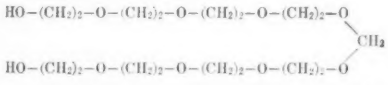
USPat 2,785,947 (Quaker Chem Prod——Kress, Abrams——March 19, 1957)

Durable calender effects, ie, glazing, embossing, schreinering, etc, hitherto have been produced by a treatment with a condensate of formaldehyde with urea, thiourea or melamine. Generally the impregnated fabrics were dried at lower temperatures, calender-treated, and then cured to set the resin. The current specification points up the notorious disadvantages of chlorine retention and bad odor emitted by these products.

These problems reportedly can be avoided by applying nonvolatile acetals from mono- or dialdehydes containing up to eight C-atoms rather than the above-mentioned resin condensates. "Nonvolatile" in this case would refer to a boiling point of at least 250°C.

Acetals, ie, condensates of monoalcohols (eg, methanol, hydroxyethanol, methoxyethoxy ethanol, etc) or glycols, such as ethylene glycol, diethylene glycols or polyalkylene glycols, with mono- or dialdehydes form monomers boiling above 125° C. By padding them on in the presence of acidic-type catalysts, drying to a moisture content of 10-15%, calendering and curing, one reportedly may obtain a durable effect free of chlorine retention and objectionable odor.

Example (#1): Diethylene glycol and paraformaldehyde were condensed in toluene solution in the presence of sulfuric acid as a catalyst. The condensate formed a viscous, water-soluble liquid, which was found to have a polymeric structure of the type



According to example #4, this product mixed with ammonium chloride was padded on a cotton fabric with a pick-up of 100%, calendered at 400°F under pressure and cured at 300°F. A durable lustrous finish resulted. The chlorine-retention test showed no effects of retained chlorine; no residual odor was perceptible.

References cited by the Patent Office:

Brit Pat 527,888 ((Calico Printers' Assoc/1940): fixing glazed or embossing effects by a treatment with acid formaldehyde.

USPat 2,207,740 (Heberlein Patent Corp/1940): superficially etherifying cellulose by a treatment with an aldehyde having a chain-length of 10 C-atoms or more.

USPat 2,350,350 (Du Pont/1944): preparing glycol formals from glycol and formaldehyde in the presence of a strongly acidic catalyst; the final products are used for coatings, finishes, etc.

USPat 2,360,477 (Esselen Inc/1944): producing water-resistant acetal-type resins under anhydrous conditions.

STABILIZING CELLULOSIC FABRICS———Acetals Applied G,2,04

USPat 2,785,948-9 (Quaker Chem Prod——Abrams, Kress——March 19, 1957)

These two patents refer to the use of "simple" acetals (USP 2,785,948) or polymeric acetals (USP 2,785,949) as stabilizing agents for cellulosic fabrics. These stabilizing finishes reportedly are free from objectionable odors and resistant to chlorine retention.

"Simple" acetals are condensates of monovalent alcohols such as methoxy ethanol or methoxy ethoxy ethanol, which form aldehyde products of the di(methoxy ethyl) formal type. Polymeric acetals are prepared from glycols and mono- or divalent aldehydes, eg, from diethylene glycol and formaldehyde.

In each case, the process calls for padding, drying and curing at elevated temperatures. Simple and polymeric acetals are also effective in the method for obtaining durable calender effects covered in USP 2,785,947.

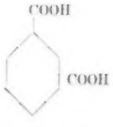
References cited by the Patent Office are the same as those cited for USP 2,785,947 (see previous abstract).

DYEABILITY OF TEREPHTHALATE FIBERS INCREASED by Admixture of Isophthalate Esters to the Dope C,4,07

Brit Pat 769,405 (Imp Chem Ind——March 6, 1957)

Terephthalate fibers, such as Dacron and Terylene, are prepared by melt-extrusion of glycol (ethylene glycol-) esters of terephthalic acid.

Superior dyeing results reportedly are obtained by blending this spinning mass with an analgous condensate of isophthalic acid



The fibers so modified are claimed to show an increased affinity for disperse dyes.

Example: 880 p polyethylene terephthalate and 220 p polyethylene isophthalate were melted together, spun and drawn 4.5 times the original length at 80° C. As the fibers were dyed in an aqueous bath containing the disperse dye Dispersol Fast Scarlet, the dyebath exhaustion at 100° C was determined at 40% after 90 min dyeing, while the nonmodified fibers exhausted the bath only 15% under otherwise equal conditions.

The same Company has suggested the spinning of blends of melted terephthalates and melted nylon mass, the latter as modifying agent (Brit Pat 610,410, of Diserens' "Chemical Technology of Dyeing and Printing" II, 292).

IMPROVING FASTNESS OF DIRECT DYEINGS——— Quaternized Polyamines plus Water-soluble Sulfates C,4,01

Brit Pat 761,668 (Farbenfabr Bayer——Nov 21, 1956)

Aftertreatments of direct dyeings with various polyethylene polyamine condensates have been advocated in the prior art [cf among others USPat 2,649,354 of Sandoz Ltd, *Am Dyestuff Reptr 43,* 383 (1954)].

According to the current patent, high-molecular quaternary peralkylation products of polyamines can be used successfully for the same purpose. The quaternary compounds must be free from ether groups; they may be obtained by condensing ethylene oxide with ammonia or by polymerizing ethylene imine, followed by peralkylation and quaternization.

A further improvement reportedly resulted by adding a water-soluble sulfate, eg, ammonium sulfate, potassium sulfate or sodium sulfate, to the aftertreatment bath containing the above quaternary compounds. The sulfates may be dissolved in the solution of the quaternized polyamines or they may be obtained *in situ* by adding, eg, sodium carbonate to the polyamines peralkylated with dimethylsulfate, acidifying with mineral acids whereby the sulfuric acid is split off, and optionally neutralizing with ammonia.

Example: Cotton dyed with 3% Benzo Light Red 8BL (Schultz, 7th ed, 1931) was aftertreated for one-half hour with a 0.5% solution of quaternized permethylated polyethylene imine and a 0.5% aqueous solution of sodium sulfate or ammonium sulfate. A considerable improvement of wetfastness was observed compared with that of fabrics treated the same way but without the addition of the sulfate.

News of the Trade

Interchemical Forms New Color & Chemicals Division

Interchemical Corporation consolidated its Textile Colors and R-B-H Dispersions Divisions into a new Color & Chemicals Division January 1st. Headquarters of the new division is in Hawthorne, NJ.

William N Davies is general manager of the Color & Chemicals Division. Mr Davies became divisional president of the Textile Colors Division in January, 1957. Previously he was a vice president of Interchemical's Printing Ink Division.

William J Rothemich is general production manager of the new division. Mr Rothemich was divisional president of the R-B-H Dispersions Division from 1947 to 1953 and of the Textile Colors Division from 1953 to 1957; more recently he has been a vice president of the parent company.

Harold D Craft will be general sales manager of the new Color & Chemicals Division. Mr Craft has been divisional president of the R-B-H Dispersions Division since 1953 and before that was sales manager.

According to the announcement, the new division has the advantage of the technical personnel and facilities of both the Textile Colors and R-B-H Dispersions Divisions on an enlarged scale. It is also in a position to make more effective use of the wide variety of production facilities which the existing divisions had previously.

The sales organization for the textile industry is unchanged, with Peter M Shonk, sales manager; William B DePass, Southern District manager; Matthew J Quigley, New England District manager; Jules J Devigne, Central District manager; and Fred Baumann, manager manufacturer and jobber sales.

Production of Aridye and Aquaprint Colors and Interchem Dyes will continue to be carried out in the Hawthorne plant. District offices, laboratories, and warehouses remain at their present addresses in Hawthorne; Rock Hill, SC; and Pawtucket, RI.

The R-B-H plant at Bound Brook, NJ, will continue to produce pigment dispersions, including dope dyeing colors for acetate and other synthetic fibers and colorants for coatings and plastics. Richard L Lynch will be sales manager—coatings and plastics industry.

Sandoz Acquires Fine Colors Co

Sandoz, Inc has acquired the stock of Fine Colors Co, Paterson, NJ, manufacturers of pigment colors.

The acquisition of a dry color plant, which became effective December 20th, places Sandoz in a strong position in the pigment field, complementing its production of dyestuffs, textile chemicals and pharmaceuticals. Sandoz has been active in the field of pigment colors for the past two years.

Fine Colors will continue to operate unchanged as a division of Sandoz, according to an announcement by James C Walker, Sandoz vice president, and extended research and testing facilities are planned for further improvement of existing facilities.

Walker

Ackerman

Gossweiler

Sandoz, Inc was established in 1919 as an independent American company by Sandoz, Ltd, Basle, Switzerland, originally founded in 1886.

The company has plants in Hanover, Fair Lawn and Toms River, New Jersey, as well as an interest in Cincinnati, Ohio. Although pigment colors is a comparatively new venture for Sandoz in the United States, its Swiss counterpart has been a leading European supplier in this field for many years.

According to Sandoz, all personnel of Fine Colors will be retained. Production will continue under the direct supervision of John W Ackerman who has been president of the company for the past 16 years, and sales and service under the direction of Max Gossweiler, manager of the division.

Specialists in the manufacture of organic colors tailored to the specific requirements of printing ink makers, Fine Colors has been supplying the ink industry for over 40 years. The firm, which also services carbon paper, artists supplies, plastics, rubber and general surface coating field, was founded in 1917 by Ira Ackerman and Karl Ellwanger.

Fine Colors currently produces a complete line of organic pigments, including Naphthol Reds, Anthrosine, Red Lake C, Lithols, Permanent Red 2B, Pyrazolon Reds, Pigment Scarlet, Bromo Toners, PTA and PMA Reds, Blues, Greens, and Violets, Benzidine and Hansa Yellows in a wide range of specialties.

Verona-Pharma Merger

E K Halbach, president of Verona Chemical Co, Newark, N J, has announced that Pharma Chemical Corp, New York, N Y, and Bayonne, N J, has been merged into the Newark company, and that the corporation will conduct business under the name Verona-Pharma Chemical Corp.

Pharma will continue to operate as a division of the corporation, as will Verona Dyestuffs of Union, and Verona Chemical of Newark.

McKiernan-Terry Expands Textile Machinery Division

The Textile Division of the McKiernan-Terry Corporation, Dover, NJ, has announced the purchase of the textile machinery division of the Wiesner-Rapp Company, Inc, Buffalo, NY. This transaction was announced jointly by John C Smaltz, president of the McKiernan-Terry Corp and Arthur J Wiesner, president of the Wiesner-Rapp Co.

Under the terms of the sale, McKiernan-Terry has received all textile machinery patents, engineering drawings, tools, fixtures, inventory and records. McKiernan-Terry will build and service machines formerly manufactured by Wiesner-Rapp.

New Ultra-Rapid Peroxide Bleaching Procedures Developed by Becco

Ultra-rapid bleaching of open-width textiles — particularly the heavier fabrics—with hydrogen peroxide is now possible by means of a series of procedures developed by Becco Chemical Division, Food Machinery and Chemical Corporation, Buffalo, NY.

All of the new procedures make use of single-stage peroxide bleaching after pretreatment by one or more of a number of prepares, which vary according to the end-result desired by the individual mill, the nature and weight of the goods, the shade and characteristics of the particular dyestuff to be employed, and the type of bleaching equipment — continuous or batch — already available.

The new Becco ultra-rapid procedures reportedly enable total processing time to be considerably reduced, and produce uniformly bleached and abrasion-free goods ready for dyeing, using a mill's present equipment in many cases.

Chemtex to Represent Fabulized in Canada

Chemtex Products, Ltd, Toronto, will represent Fabulized, Inc in Canada. "Fabulized" is a new finishing process which is claimed to give synthetic fabrics and blends the highest degree of absorbency yet developed. The Chemtex offices are located at 49 Densley Avenue, Toronto 15, Ontario.

RARE BOOK FOR LOWELL TECH—Sidney M Edelstein, president of Dexter Chemical Corp, and chairman of AATCC's Archives Committee, presented the earliest known printed book on dyeing and spot removing, printed in Mainz, Germany in 1532, to the Alumni Memorial Library at Lowell Technological Institute during a recent visit. A bound English translation of the German work accompanied the gift, which will be featured in the library's rare books section. L to r: George P Paine, executive secretary, AATCC; Martin J Lydon, LTI president; Dr Edelstein; LTI Librarian Joseph V Kopycinski; George O Linberg, AATCC president; and Howard K Moore, director of the LTI libraries.

NYBT Symposium on Nonwoven Fabrics

The New York Board of Trade's symposium on Nonwoven Fabrics will be held January 28 at the Hotel Sheraton-Astor.

The production, end-uses, methods of distribution, consumer reactions and future applications of nonwoven fabrics will be covered by a panel composed of individuals with wide experience in these phases of the textile industry.

Serving on the committee are: Thomas O Boucher, Chicopee Mills, Inc; Ralph J Bachenheimer, Iselin-Jefferson Co, Inc; Jackson E Spears, Burlington Industries, Inc; and Cameron A Baker, United States Testing Co, Inc.

Reservations may be made through the secretary's office of the textile section at the Board of Trade's offices, 291 Broadway, New York. A luncheon will precede the discussion.

Plant Maintenance & Engineering Show

Topics of major interest to a wide variety of industries, including the textile, chemical, materials handling and machinery fields, will be covered at the Plant Maintenance & Engineering Show at the International Amphitheatre, Chicago, Jan 27-30.

Dyeing, and the improvement of cotton fabrics through chemical treatment, were discussed when officials of the American and European branches of Ciba visited the Southern Utilization Research and Development Division of the Agricultural Research Service, USDA, New Orleans, La. Resin treatments for crease resistance, the new APO-THPC flame-retardant process, and full and partial acetylation of cotton for resistance to damage by heat and rot, were among the research projects at the Southern Laboratory described to the visitors. Pictured, from the left, are: F S Perkerson, SURDD; O Albrecht, director of research, Ciba, Ltd, Basle, Switzerland; C J Weidmann, technical director, Ciba Co, Inc, New York; J David Reid, SURDD; S N Glarum, chief chemist, Ciba, New York; and L W Mazzeno, SURDD.

John Boulton, director of research, Droylsden Research Laboratory, Courtaulds Ltd, Manchester, England, discusses textile research with C H Fisher, director of the Southern Utilization Research and Development Division of the Agricultural Research Service, USDA. Pictured, from the left, are Dr Fisher; John Wharton, director of research, Courtaulds, Mobile, Ala; Geoffrey Lund, also of Courtaulds at Mobile; and Mr Boulton. While at the Southern Regional Research Laboratory, Mr Boulton gave a seminar on dyeing of cellulose. He is one of several British textile scientists and executives who visited the USDA's cotton utilization research center in New Orleans, La, after attending the joint meeting of the Textile Institute, and the Fiber Society, its American counterpart, held in New York.

NAMES IN THE NEWS

Marnon

Donald E Marnon recently joined Berkshire Color & Chemical Co, Delawanna, NJ, as vice president in charge of technical coordination at the Reading, Pa, plant. During the past four years, he has served as technical assistant to the president of American Aniline Products, Inc and as manager of technical service of American Aniline Products, a unit of Koppers Co, Inc.

Mr Marnon, inventor and codeveloper of the Marhen Process for control of vat dye application, is currently chairman of the Metropolitan Section, AATCC.

Several members of A & M Karagheusian's management and top supervisory group retired on January 1st.

Warren C Bufton, plant manager of the Company's Freehold, NJ branch, who joined the Company in 1936, is succeeded by **Edwin B Bachman,** formerly assistant manager. Mr Bachman also joined the Company in 1936.

Everett Woolfenden, superintendent of dyeing, has completed 41 years with the firm. He is succeeded by **John Toon,** former assistant superintendent of dyeing.

Others who retired and their years of service include: **James McGowan,** 50 years; **Joseph Clayton,** 40 years, **Henry Grasberger,** 38 years, and **Alfred Cronk,** 31 years.

B D Thomas, scientist and research administrator, has been named to the presidency of Battelle Memorial Institute to succeed **Clyde Williams,** whose retirement as president was announced recently. Dr Thomas has been an active head of Battelle since being named a director a year ago.

Arno F Haas has terminated a long connection with International Processing Co and is now superintendent of dyeing and finishing at the Neisler Mills Division of Massachusetts Mohair Plush Co, Kings Mountain, NC.

Blackstead

Henschel

Eric N Blackstead has been elected vice president of Sun Chemical Corp and general manager of its chemicals group, including Warwick Chemical Div and the newly acquired Ansbacher-Siegel Corp. Mr Blackstead formerly was vice president and general manager of Ansbacher-Siegle.

Sun Chemical also has announced the promotion of **Alfred N Henschel** to the position of technical service manager for New England, Warwick Chemical Div. Mr Henschel joined the Division in April, 1953, as sales representative.

Hager

Onslow B Hager, director of research at Alco Oil & Chemical Corp, Philadelphia, Pa, since 1947, has been elected a vice president. Prior to his association with Alco, he served as head of one or more textile laboratories of Rohm & Haas Co.

Nelson

Dewey H Nelson has been promoted to assistant manager of the Becco Chemical Div, Food Machinery and Chemical Corp, Buffalo, NY. He will continue in the capacity of sales manager, a position he has held since November, 1956.

Peattie

Election of **Kenneth R Peattie** to the position of vice president in charge of procurement, and the appointment of **R Power Fraser Jr** to the position of general sales manager succeeding **Jule F Marshall,** has been announced by American Felt Co, Glenville, Conn.

Mr Peattie has been with the firm since 1929 and has been the company's wool buyer for the past 13 years. He will continue this activity as well as the responsibility for the purchasing of all raw materials.

Mr Fraser has been assistant general sales manager for the past year and previously was general production manager in charge of the company's manufacturing operations. Mr Marshall, who has been with American Felt for the past 41 years, is retiring from active service with the company but will continue as a director and serve in an advisory capacity.

Albert J Royce Sr, president and founder of Royce Chemical Co, Carlton Hill, NJ, recently tendered a party at the Pennington Club, Passaic, NJ, to **P J Wood,** technical director of the firm. Mr Wood, 1957 Olney Medal winner, was honored for his 20 years with Royce Chemical. He received a gold watch.

In addition to Mr & Mrs Royce and Mr & Mrs Wood, the following Royce personnel and wives attended the dinner: **A J Royce Jr, Mr & Mrs H C Royce, Mr & Mrs R L Jones, Mr & Mrs H A Nelson, Mr & Mrs A J Berube, Mr & Mrs W J Donnellon, Mr & Mrs Hugh Brady, Mr & Mrs Gerard Geene, Albert Hall, Mr & Mrs C J Monks,** and **Mr & Mrs Walter Wedas.**

Raymond W Jacoby, consultant, past president of AATCC, spoke recently at the 1957 Annual Winter Smoker of the Columbia University Engineering Alumni Association, held at the Columbia University Club, New York, NY, on the topic "Intriguing Aspects of Textiles." The talk will be published shortly in the Association's magazine.

Herbert Luber has joined the sales staff of De Paul Chemical Co, Inc, Long Island City, NY with more than 30 years experience as production superintendent of textile processing plants. Mr Luber will work from their Long Island City offices at present.

Fabulized, Inc, Philadelphia, Pa, has announced the appointment of **Willard K Sawyer** as assistant divisional sales manager for the South. Fabulized's southern office is located at 846 South Main Street, Burlington, NC.

Heinz A Lips, for the past four years dyes sales supervisor in the Chicago district office of Du Pont's Organic Chemicals Department, has been named manager of the paper sales section of the company's Dyes and Chemicals Division in Wilmington, Del.

Clark Erwin has resigned as purchasing agent for Lyman Printing & Finishing Co.

All purchasing of supplies is under the direct control of **W M Hull. Reginald Campbell** has been named assistant purchasing agent in charge of purchasing at Lyman, SC, and **Enniss McCarter** will continue to handle packaging supplies and put up supplies. **Bays Blackman** continues as assistant purchasing agent at Rock Hill.

Smith

Zwick

Marvin H Smith Jr has joined Southern Sizing Co, East Point, Ga, as director of research and product development. He was formerly with the research department of Emery Industries, Inc, Cincinnati, O, and the Grace Bleachery Division of the Springs Cotton Mills, Lancaster, SC.

G C Zwick has been named special field representative for The Goodyear Tire & Rubber Co's Chemical Division. From headquarters in Chicago, he will provide sales and technical service for the high polymer resins, rubbers and latices marketed by the Division.

Schramm

Knights

Fenn

Camp

Sindt

Personnel news of note from National Aniline Div, Allied Chemical & Dye last month concerns the following:-

Arthur T Schramm has been named resident manager—New York Branch, succeeding **Charles C Knights,** who retires after 40 years' service with the Company. Mr Schramm has been manager—certified colors for National Aniline since June 1956. He will continue to represent the Company in matters involving the Food and Drug Administration and will serve as Company representative on the Certified Color Industry Committee.

Harris B Fenn Jr has been named manager — dyestuff sales; **Eric W Camp,** West Coast resident manager; and **Erwin J Sindt,** resident manager of the Chicago sales branch, replacing Mr Camp. Mr Fenn, formerly West Coast resident manager, assumes a newly created position at the Company's General Office in New York, in which he will be responsible for sales of National dyestuffs on a nation-wide basis, reporting to **Harold L Rieg,** director — dyestuff sales and branch operations. Mr Camp, resident manager at Chicago since 1943, is now headquartered at Allied Chemical's new consolidated sales office at 235 Montgomery St, San Francisco. Mr Sindt has been in a sales capacity at the Chicago branch since 1932.

James B Clarke, associated with the Chicago sales branch since 1930, has been named sales representative at Portland, Ore, to replace **F H Ihlenburg,** who recently resigned. Mr Clarke will report to the West Coast manager in San Francisco.

Gordon B M Walker, who has been employed in an industrial and management engineering capacity by Allied Chemical since 1954, has been named Division Industrial Engineer, reporting to **A E Cleghorn,** president of National Aniline.

Mr Knights, who has been resident manager of the New York sales branch since 1927, was born in Melrose, Mass, and received his early education in that city. Following his graduation from Bates College, he taught chemistry there for one year. After several years' experience as chemist and purchasing agent for Lewiston Bleachery & Dye Works, Lewiston, Me, he joined the Century Color Corp, Boston, in 1917, and transferred to National Aniline in New York the following year when Century became a part of National Aniline. An AATCC member, Mr Knights will continue to reside at Chatham, NJ.

Harris L Johnson, a senior at the School of Textiles, North Carolina State College, is the first winner of a $500 scholarship established in 1957 by the Chemstrand Corp at the college.

DeMallie

Stampley

Callaway Mills, Inc has announced the appointment of **Stephen P DeMallie** as technical assistant to the president, **R D Williams, Jr.**

Mr DeMallie was formerly with Celanese Corp of America in sales and sales development capacities in New York and Charlotte.

West End Chemical Co, Oakland, Calif, has announced the appointment of **R M Stampley** to its sales staff. Stampley, formerly with Dorr-Oliver, Inc, for 10 years, will handle the marketing of anhydrous sodium sulfate, soda ash and lime products to the chemical processing industries.

Palmer

Magoffin

Williams

Ford

The advancement of three officers and the election of two new vice presidents by the board of directors of Eastman Chemical Products, Inc has been announced concurrently with the election of a new vice president and an assistant vice president of Tennessee Eastman Co, a manufacturing division of Eastman Kodak Co. Eastman Chemical Products, Inc is Eastman Kodak's marketing subsidiary for products manufactured by the Tennessee and Texas Eastman divisions.

Spencer E Palmer, formerly a vice president, has moved up to first vice president of Eastman Chemical Products, Inc. **R S Leonard,** formerly comptroller, has assumed the duties of assistant vice president; and **R L Flanery,** formerly assistant comptroller, has become comptroller.

The new officers are **James E Magoffin** and **David C Williams,** who were elected vice presidents. Dr Magoffin has served as sales manager, chemicals division, Eastman Chemical Products, Inc, since 1953. Mr Williams has been sales manager of ECP's plastics division since 1953.

The election of these officers has brought the following additional changes: **John P Tokarz,** formerly assistant to the first vice president of Tennessee Eastman, has become assistant to the Eastman Chemical Products first vice president; and **Guy A Kirton,** formerly assistant sales manager for the chemicals division, has assumed the duties of sales manager, formerly held by Dr Magoffin.

Henry L Ford, a vice president of Eastman Chemical Products, Inc, who heads the chemicals division, has been elected a vice president of Tennessee Eastman Co. **W Chamberlain Hale,** who became director of production planning at Tennessee Eastman in 1953, has been named an assistant vice president.

New appointees in American Cyanamid Company's Organic Chemicals Division include **George W Hedden Jr,** assistant manager of manufacturing; **T E Hazell Jr,** sales manager of the intermediates department; and **A J Weith Jr,** commercial development manager.

Mr Hedden will be responsible for the operations of Cyanamid plants at Charlotte, NC, Marietta, O, Willow Island, W Va, Damascus, Va, and the facilities at Bound Brook, NJ, where he will continue to make his headquarters. He has been with Cyanamid since 1932, most recently as assistant to the division manager of manufacturing.

Dr Weith, with Cyanamid since 1952, has been departmental sales manager in the petrochemicals department since 1956. Mr Hazell has held numerous sales and purchasing posts with the company since joining it in 1946.

Frank M Cowen has been named manager of the Textile Chemicals Research Section in the Bound Brook Laboratories of Cyanamid's Research Division, succeeding **Jason M Salsbury,** who recently became manager of the Technical Department of the Fiber Division's Santa Rosa, Fla plant. Mr Cowen's most recent post with Cyanamid was that of group leader in the Process Development Department.

OBITUARY

ALBERT T MATTHEWS, 80, retired general manager of B F Goodrich Textile Products, a division of The B F Goodrich Company, died Friday, November 30, at his home in Thomaston, Ga.

Mr Matthews became the first general manager of the B F Goodrich Textile Division when it was established in 1928, and retained that position until his retirement in 1942.

WILLIAM RANDOLPH McCREARY, 56, chemist for the J S Young Co, Baltimore, Md, died suddenly on October 31st while at work. Mr. McCreary was long identified in the tanning industry, having been associated with Taylor, White Extracting Company prior to his going with Young.

SYLVESTER V COTTRELL, associated for nearly forty years with National Aniline Div, Allied Chemical & Dye Corp in dyestuffs and chemical sales in the Chicago and Detroit areas, died suddenly November 4th while on a visit to New York.

LELAND K SPINK, 58, engineer in charge of flow measurement at The Foxboro Co, Foxboro, Mass, died December 23rd in Foxboro. Widely recognized as an authority on flow measurement, Mr Spink pioneered in calculating and coordinating flow data.

Brown

Fryer

Campbell

Malinowski

John R Brown Jr, formerly vice president—research and development of Spencer Chemical Co, has been elected a director and vice president in charge of research and development of Colgate-Palmolive Co.

Ronald J Fryer is now working as sales representative for the dyestuff and chemical divisions of Sandoz, Inc. He reports to the company's Charlotte office, and travels the states of Georgia, Tennessee, and Alabama.

Pennsylvania Industrial Chemical Corp has appointed **Clarence C (Bob) Campbell** manager of textile chemicals. He will supervise textile industry projects at Picco's sales-service laboratory at Clairton, Pa, and will coordinate technical service through the company's sales offices. He had been with Collins & Aikman Corp, where he set up and managed a new foam-rubber laboratory.

Atlas Powder Company's Chemicals Division has a new assistant director of product development in **Theodore Malinowski,** former development manager in the department. He will head up the exploratory field development and market research sections of the department.

New councilors for the Association of Consulting Chemists and Chemical Engineers, Inc include **A G Ashcroft,** Arthur D Little Inc; **Harry A Kuhn,** consulting chemist; **Irving Levenstein,** Leberee Labs Inc; **David R Schwarz,** Schwarz Labs Inc; and **Eugene W K Schwarz,** textile consultant. Each will serve 3-year terms.

AMERICAN OIL CHEMISTS SOCIETY
Apr 21-23, 1958 (Memphis); Oct 20-22, 1958 (Chicago); Spring, 1959 (New Orleans); Fall, 1959 (Los Angeles)

AMERICAN SOCIETY FOR QUALITY CONTROL—TEXTILE DIVISION
8th Annual Conference—Jan 30-Feb 1, Clemson House, Clemson, SC

General Calendar

AMERICAN SOCIETY FOR TESTING MATERIALS (COMMITTEE D-13)
Mar 18-21 (Spring Meeting, Sheraton Park Hotel, Washington, DC)

THE DRYSALTERS CLUB OF NEW ENGLAND
Jan 20, May 2 (Hotel Vendome, Boston, Mass); June 20 (Outing—Wachusett Country Club, West Boylston, Mass)

THE FIBER SOCIETY
April 30—May 1 The Clemson House, Clemson, SC

TECHNICAL LITERATURE

(Literature is available from sources shown in italics)

ACTIVATED HYDROGEN PEROXIDE BLEACHING PROCESS FOR COTTON—*Solvay Process Div, Allied Chemical & Dye Corp, 61 Broadway, New York 6, NY*———The booklet discusses advantages of the process, operating details, commercial application and savings in cost of chemicals. It includes quality comparison tables that show the increase in whiteness, whiteness retention, purity, absorbency and dyeability when the Solvay Activated Hydrogen Peroxide Process is used.

AFTERMERCERIZATION OF RESIN-TREATED COTTON FABRICS — *Southern Utilization Research and Development Div, P O Box 7307, New Orleans 19, La*———Reprints of this article which appeared in the October 7, 1957 issue of *American Dyestuff Reporter*, may be obtained without cost from SURDD.

AN EVALUATION OF FUNGICIDAL TREATMENTS IN COTTON CARGO PARACHUTE WEBBINGS STORED AT WRIGHT AIR DEVELOPMENT CENTER—*E F Little, Wright Air Development Center, U S Air Force; May, 1957; 98 pages. (Order PB 131158 from OTS, U S Department of Commerce, Washington 25, DC, $2.50.)*———Treatment with an effective fungicide is necessary to protect cotton materials against fungus attack and consequent deterioration brought on by exposure to humid conditions. In this research five commercial fungicidal formulations were evaluated for protection of cotton parachute webbings and individual webbing threads. Fungicide-treated materials, with and without added water repellent, were tested in soil, simulated tropical storage, laboratory shelf storage, agar plate exposure, and agar plate exposure after shelf storage. Cellulolytic fungi were used as test organisms. It was found that formulations of copper 8-quinolinolate were effective if the minimum metallic copper content was 0.14 percent by weight of the treated material. Webbings containing a minimum 0.9 percent dihydroxy-dichlorodiphenyl methane by weight were equally effective. Materials treated with dehydroabietyl ammonium acetate were not resistant to fungi in soil. This formulation also caused primary skin irritation to humans.

ASTM STANDARDS ON SOAPS AND OTHER DETERGENTS—*$2.75; American Society for Testing Materials, 1916 Race St, Philadelphia 3, Pa.*———This compilation brings together in convenient form for use in industry all of the ASTM standards and tentatives pertaining to soaps and other detergents. Included are seventeen specifications for soaps and soap products, nine specifications for various alkaline detergents, and sixteen methods of analysis covering soaps and other detergents. Definitions of terms applying to these materials are also included. Of the standards contained, ten are new or recently revised.

The specifications, methods of test, and definitions included in this publication represent the work to date of ASTM Committee D-12 on Soaps and Other Detergents. The book should be of interest to soap and detergent manufacturers, textile manufacturers, chemists, and the users of cleaning materials in quantity such as commercial laundries, hospitals and similar institutions, and government agencies.—6x9", paper cover, 180 pp.

CACHALOT FATTY ALCOHOL DATA SHEET—*M Michel and Co, Inc, 90 Broad St, New York 4, NY*———This new fact sheet on Cachalot brand fatty alcohols shows typical uses for these lauryl, cetyl, stearyl, and oleyl alcohols.

CARWIN PRODUCT CATALOG—*The Carwin Co, North Haven, Conn*——— This 28-page catalog describes the Company's complete product line, including chemical intermediates for the dyestuff, pigment and pharmaceutical industries, as well as isocyanates for foam, adhesive, resin, elastomer and other end uses.

CHARACTERISTICS, GRADES AND CONTAINERS FOR 24 BASIC CHEMICALS USED BY INDUSTRY—*Industrial Chemicals Div, Olin Mathieson Chemical Corp, Baltimore 3, Md*——— This 16-page booklet contains information on organic, inorganic and specialty chemicals, and lists the location of the production points for each product.

In the past few years, Olin Mathieson has broadened its production and distribution facilities to coincide with key market requirements.

CHEMICAL SAFETY DATA SHEET SD-69, BENZYL CHLORIDE — *30¢, Manufacturing Chemists' Assoc, Inc, 1625 Eye St, NW, Washington 6, DC*———This 16-page booklet contains updated information on properties, hazards, control, employee safety, fire fighting, handling and storage, cleaning and repair, waste disposal, medical management and first aid.

"COLOR SELLS—YES"—*Dept P10, Macbeth Corp, Newburgh, NY*———Bulletin #262 gives information on efficient color-matching lighting. Charts and other technical data show the how and why of Macbeth daylighting. It suggests the lighting unit tailored to one's particular needs, and shows how to avoid metameric matches, how to solve critical color-matching problems over the phone, and how to set up ideal artificial north sky daylight viewing conditions 24-hours a day in the plant, office or laboratory.

DAYLIGHT FLUORESCENT PIGMENTS—*Switzer Bros Inc, 4732 St Clair Ave, Cleveland 3, O*———Technical Bulletin No. 1115, a 14-page brochure, includes complete data on daylight fluorescent pigments, a chemical structure of the preferred pigment medium, sample formulas, and additional information about this rapidly developing branch of modern chemistry.

DILUTION OF HYDROGEN PEROXIDE—*Solvay Process Div, Allied Chemical & Dye Corp, 61 Broadway, New York 6, NY*———Detailed and concise information on the methods and equipment for diluting commercial grades of hydrogen peroxide is contained in this new booklet.

Included are dilution formulas for 27½%, 35% and 50% hydrogen peroxide, information on containers, stability tests and analysis of dilute solutions as well as four easy-to-use dilution charts.

FIRST SUPPLEMENT TO "ENCYCLOPEDIA OF CHEMICAL TECHNOLOGY"—*Interscience Publishers Inc, 250 Fifth Ave, New York 1, NY*——— This first supplement volume to the 15-volume "Encyclopedia of Chemical Technology," reputedly the largest technical book ever published in America, now includes articles on subjects which were hardly in existence when the Encyclopedia was first planned and might be described as "the chemical technology of the future": Algal cultures, Automation, Boron Hydrides, Computers, Nuclear Reactors, Photovoltaic Solar Converters, Solar Energy.

In 978 pages, with its own index, the supplement volume comprises over fifty

articles from Acrolein to Water Demineralization. Each article, written by one or more experts and reviewed by other experts in the field, reports on a subject of topical interest, where progress has been so rapid that the original coverage requires supplementation.

A number of articles deal with industrial products or processes: Adhesives, Cyanoethylation, Detergents, Epoxy Resins, Kojic Acid, Polyethylene, Sorbic Acid. Unit operations are represented by: Extraction, Fluidization. The new tranquilizing drugs are described under Psychopharmacological Agents, and scientific fundamentals are represented by Articles on Catalysis, Inclusion Compounds, Polymers, and Solid State.

The Encyclopedia covers the span from 1947 (Volume 1) to 1956 (Volume 15). The 978 supplementary pages increase the overall size of the work to 14,783 pages of text and a comprehensive index.

FOXBORO ACCESSORIES AND SUPPLIES CATALOG — *The Foxboro Co, Foxboro, Mass*———Complete information on industrial instrument accessories and supplies has been compiled in this new 60-page catalog. The loose-leaf book, Catalog 500, includes specifications, part numbers and prices for more than 250 commonly furnished instrument parts and supplies.

In addition to an alphabetical index, the illustrated catalog is divided into five sections: Mechanical, Pneumatic, Electric-Electronic, General, and Tools and Service.

Among the items covered are pressure gauge and flow meter accessories, thermometer wells, bushings and flanges, air supply regulators and filter sets, thermocouples, dew point elements, charts, chart drives, instrument pens and ink.

1958 GUIDE — DOW CORNING SILICONES—*Dow Corning Corp, Midland, Mich*———This guide is described as "the largest and most complete silicone catalog ever published."

Describes over 150 commercially available Dow Corning silicone products, including many introduced within this past year. Contains detailed charts, tables, graphs and data on properties and performance, along with illustrated examples on how silicones can cut costs, simplify design and add new sales appeal to products in every field of application.

Cross-indexed for ready reference. Sixteen pages, heavily illustrated. Code #1-113.

GUIDE TO CARBIDE'S PRODUCTS AND SERVICES — *Union Carbide Chemicals Co, 30 E 42nd St, New York 17, NY*———F-6136, Carbide's new 1958 "Physical Properties" booklet, presents the latest physical property data on more than 350 organic chemicals. An alphabetical index is included for the convenience of the user.

Fifty new chemicals introduced by Carbide since the previous edition are featured. For easy reference, chemicals are arranged by related chemical groups with condensed application data. — 28 pages.

HOW TO TEST BECCO HYDROGEN PEROXIDE BLEACHING SOLUTIONS; HOW TO HANDLE BECCO HYDROGEN PEROXIDE SAFELY — *Becco Chemical Div, Food Machinery & Chemical Corp, Buffalo 7, NY*———Two useful wall charts, each measuring 16" x 21", contain helpful suggestions printed in large type. They are designed to be hung at points of peroxide storage and usage for quick reference.

The safety chart lists handling precautions and recommended action in case of contact of H_2O_2 with the skin or eyes; rules for handling and unloading drums, such as storing drums with the vents up, not putting water or other liquids into drums, and what to do if spillage should occur; and rules for unloading tank cars, such as spotting cars on level track, 15-pound maximum pressure when unloading with compressed air, etc.

The testing chart covers peroxide concentrations and alkali concentrations.

INDANTHRENE PRINTING BROWN HRR SUPRAFIX PASTE—*Bulletin G-798, General Dyestuff Co, 435 Hudson St, New York 14, NY*———G-798 covers this new, straight, modified-anthraquinone vat dyestuff offered for printing bright reddish browns of superior light- and wetfastness on cotton, rayon, and linen. This new brown reportedly offers three advantages over older vat browns and brown combinations used for printing: economy, fastness of shade to resin finishing, and less tendering of cellulosic fabrics upon exposure to light.

The bulletin discusses Properties (shade and strength, fastness, working properties); Uses; Application (printing recipes for cotton and rayon, soaping prints); and Fastness Ratings of Full Shades on Cotton and Rayon.

JANUARY-JUNE, 1957, LIST OF PUBLICATIONS AND PATENTS OF THE SOUTHERN UTILIZATION RESEARCH AND DEVELOPMENT DIV, USDA — *Southern Utilization Research and Development Div, Agricultural Research Service, U S Dept of Agriculture, 1100 Robert E Lee Blvd, New Orleans 19, La*———This 38-page booklet presents in abstract form 70 publications by members of the Division research staff reporting developments on the chemistry and utilization of southern farm products, as well as eight patents on such developments.

Among the subjects included are the chemical and mechanical processing of cotton, and fundamental studies on cotton fiber. Among the developments described in the cotton publications are the new APO- and APS-THPC flame retardants, and treatments for water and oil repellency. A new method for differentiation of microorganisms by infrared spectra of their acetone extracts is included in the listings.

KIMAX LABORATORY GLASSWARE—*Ace Glass Inc, Vineland, NJ*———Kimax is made of K-33 glass, a borosilicate glass with outstanding resistance to heat, mechanical shock and chemical attack. It is interchangeable with, and can be sealed to, presently available borosilicate glassware.

In addition to Ace fabricated standard glassware and custom-fabricated glassware to specifications, Ace also distributes quality related products.

MACBETH - ANSCO ELECTRONIC DENSITOMETER—*Dept P10, Macbeth Corp, Newburgh, NY*———This illustrated bulletin gives a detailed story of the new Macbeth-Ansco Densitometer Model 12-A, pointing up such features as the 0-4.0 meter scale; accuracy over entire scale ±.02 density units; instantaneous response; new optical system; new improved narrow pass band filters.

NAXOL* (CYCLOHEXANOL)—*National Aniline Div, Allied Chemical & Dye Corp, 40 Rector St, New York 6, NY*———Technical bulletin I-20 (32 pages) contains what is believed to be the most complete data yet to be assembled on this unusual chemical intermediate. It contains 10 pages of physical and chemical properties, and describes and illustrates all principal reactions. It also provides 11 pages of suggested uses, including dyes and textile uses. Included is a comprehensive bibliography of 266 literature references.

———

*Trademark.

NEW SILICA GELS, HYDRO GELS AND OTHER SYNTHETIC SILICAS—*American Industrial Chemical Corp, Div of Amerace Corp, Cooper Park, Butler, NJ*———Bulletin No. MAC, 4 pages, discusses these new products as well as the company's new continuous process, which is said to be capable of economically producing either small or large quantities of standard or special compounds.

NIACET VINYL ACETATE MONOMER—*Union Carbide Chemicals Co, 30 East 42nd St, New York 17, NY*———F-7575, a 16-page booklet, has sections on operating procedures, physical properties, specifications, shipping data, applications, polymerization techniques, analytical procedures, and physiological properties.

Niacet vinyl acetate is an economical monomer that forms polymers having adhesive and film-forming properties adaptable to many uses. In textile finishing applications it is often used in combination with other vinyl monomers and with acrylic monomers.

ONE-VOLUME LIBRARY ON OVERHEAD CONVEYORS — *Rapistan-Keystone Co, Inc, 21751 W 8 Mile Rd, Detroit 41, Mich*———Collected in a single folder are engineering data, field reports on use of overhead trolley conveyor systems, product bulletins, material on features of Rapistan overhead conveyors, tips on maintenance and other helpful information.

Pictures, charts, drawings and diagrams provide complete illustration of essential factors to consider in selecting,

installing, maintaining and operating equipment, and detailed descriptions are included on components such as trolleys, chain, types of drives, traction wheel and roller turns, takeups, carriers, hooks and accessories.

OPEN-WIDTH BLEACHING RANGE WITH SODIUM CHLORITE—*Elmo International, 7 Church St, Paterson, NJ*———This illustrated brochure covers the Comerio Ercole Open-Width Bleaching Range (with sodium chlorite), a new range suitable for fabrics of cotton, rayon, spun rayon, and synthetic fibers.

POLYOX WATER-SOLUBLE RESINS—*Union Carbide Chemicals Co, 30 East 42nd St, New York 17, NY*———This 10-page brochure provides advance technical information on the Polyox water-soluble resins, a new group of exceptionally high molecular weight polymers of ethylene oxide.

Suggested uses in textiles as a warp size, stiffening agent, thickener for print paste, antistatic agent, binder in nonwoven fabrics, and a component of rug-backing formulations, are outlined along with other applications.

Physical properties and characteristics of available grades are covered in detail.

POWDERED ACTIVATED NUCHAR FOR PURIFICATION AND RECLAMATION—*Industrial Chemical Sales Div, West Virginia Pulp & Paper Co, 230 Park Ave, New York 17, NY*———12-page booklet offers helpful hints on the use of Nuchar for the removal of impurities and objectionable taste and odors and on Nuchar's ability to absorb desirable materials which are to be recovered.

PROCEEDINGS OF MCA'S 1957 AIR AND WATER POLLUTION ABATEMENT CONFERENCE — *$2.00; MCA, 1625 Eye St NW, Washington 6, DC*———The 131-page, illustrated book contains 14 papers dealing with pollution abatement. Subjects include dispersion determination, evaluation of air pollution statutory approaches, techniques for biochemical oxidation, assimilation of organic pollutants, developing company interest, multipurpose incineration, sedimentation plant design, incineration of organic wastes, and others.

Authors of the papers are recognized leaders in the field. The abatement conference, first of its kind since 1954, was held last April under the sponsorship of the Manufacturing Chemists' Association.

PROTAKYP 'K' SPECIAL ALGINATE—*Croda Inc, 15 East 26th St, New York 10, NY*———Protakyp K is a special alginate for thickening vat dye print pastes and other pastes containing alkalies.

This 4-page brochure gives specific recipes for thickening (alone or combined with starch, British Gum, etc); a stock paste for vat dyes with Protakyp K alone; a stock paste for vat dyes with Protakyp K/wheat starch thickening; and formulas for printing with black sulfur dyes and discharge printing with Naphthol AS dyes.

PVC - PROTECTED APRONS, GLOVES, GARMENTS — *Jomac Inc, Philadelphia 38, Pa*———A new line of polyvinyl chloride-impregnated industrial clothing — garments, gloves and aprons—combining light weight, flexibility and resistance to chemicals, oils and abrasion is illustrated in three bulletins, which point out the advantages of these clothing items in providing protection for workers.

The clothing reportedly will resist virtually all chemicals used throughout industry, including acids, alkalis, oils, solvents, fats, greases, alcohols and waxes.

The individual bulletins—one each for general clothing, gloves and aprons—describe and illustrate product features and detail the range of sizes, styles and colors that are available.

PVP BOOKLET—*Antara Chemicals, General Aniline & Film Corp, 435 Hudson St, New York 14, NY*———A detailed, 48-page booklet on the versatile, high-molecular-weight polymer PVP (polyvinylpyrrolidone), describing its chemical and physical properties and the numerous applications so far developed.

Among the uses discussed are textiles, soaps, detergents, protective coatings, plastics, and others. Also described are its film-forming properties, compatibility, stability, protective colloid action, cross-linking, detoxifying properties, and its physiological acceptability.

SPECIFICATIONS AND CHARACTERISTICS OF FATTY ACIDS—*Emery Industries, Inc, Dept 5, Carew Tower, Cincinnati 2, O*———A section of the "Emeryfacts" series, the booklet covers Emery's complete line of fatty acids, including Emersol stearic and oleic acids, Hyfac hydrogenated fatty acids and glycerides, Emery animal and vegetable fatty acids, and Hyfac castor oil derivatives. The brochure also contains a list of the current technical literature offered by Emery.

SUPERLOSE AND RAMALIN NEW PRODUCTS BULLETIN—*Colloid Dept; Stein Hall & Co, Inc, 285 Madison Ave, New York 17, NY*———This 12-page booklet on Superlose and Ramalin (amylose and amylopectin) describes the physical and chemical properties of these two principal components of potato starch.

SWEATER SALES TO COLLEGE MEN—*Playboy College Bureau, 232 East Ohio St, Chicago 11, Ill*———This market report, prepared by *Playboy* Magazine, is based on interviews with men's wear retailers located throughout the country which cater primarily to campus traffic. Information is given as to the styles and types of sweaters most in demand, as well as to the percentage of traffic in brand name merchandise as opposed to "private label" stock.

SYNTHETIC ORGANIC CHEMICALS, UNITED STATES PRODUCTION AND SALES, 1956 (Report No. 200, Second Series)—*65¢, Superintendent of Documents, U S Government Printing Office, Washington 25, DC*———According to the report, the combined production of all synthetic organic chemicals and their raw materials as a group in 1956 was 82,121 million pounds, or 9.8 percent more than the 74,821 million pounds produced in 1955. Total sales in 1956 amounted to 45,518 million pounds, valued at 5,831 million dollars, compared with 42,966 million pounds, valued at 5,518 million dollars, in 1955. As these data represent totals for chemical raw materials and semifinished and finished products, they necessarily include considerable duplication. Preliminary reports were issued earlier in 1957 on production and sales in 1956 of the several individual groups of synthetic organic chemicals and their raw materials.

The statistics given in the final report, the fortieth issued on the synthetic organic chemical industry by the Tariff Commission, were compiled from data supplied by 620 manufacturing companies and company divisions. The report covers about 6,000 individual chemical products, and gives production and sales statistics for many of them separately. Also given in the report is a list of manufacturers of each item for which production and sales were reported, and statistics on United States general imports of products in 1956 under paragraphs 27 and 28 of the Tariff Act of 1930, which cover coal-tar intermediates, dyes, medicinals, and other finished coal-tar products. The report also gives statistics on the number of technical workers engaged in research in the synthetic organic chemical industry, their average salaries, and the amounts expended for such research by the reporting companies.

The report comprises three major sections—chemical raw materials, cyclic intermediates, and finished synthetic organic chemical products. The first section includes statistics on tar, tar crudes, and crude chemicals derived from petroleum and natural gas. The combined production of coal tar, water-gas tar, and oil-gas tar in 1956 amounted to 891 million gallons—2.5 percent less than the 914 million gallons produced in 1955. Production in 1956 of all tar crudes amounted to 14,560 million pounds, compared with 14,292 million pounds in 1955. The most important individual products in this group are benzene, toluene, xylene, naphthalene, and creosote oil. The output of crude products from petroleum and natural gas in 1956 was 17,898 million pounds, compared with 16,179 million pounds in 1955—an increase of 10.6 percent. Such products include benzene, toluene, xylene, and other cyclic products, and aliphatic hydrocarbons such as ethane and ethylene, propane, and 1,3-butadiene.

Production of cyclic intermediates, which are covered in the second section of the report, amounted to 6,600 million pounds in 1956, an increase of 9.7 percent over the production of 6,016 million pounds in 1955. As in previous years, over 60 percent of the output of cyclic intermediates was used by the original manufacturers to produce more advanced products; the remainder was sold to other companies for further processing.

The third section of the report shows that the output of all finished organic chemicals and chemical products as a group in 1956 amounted to 34,152 million pounds, compared with 29,190 million pounds in 1955. Of this total, finished cyclic products in 1956 accounted for 6,469 million pounds, and acyclic products for 27,684 million pounds. Of the 11 groups of finished synthetic organic chemicals, eight were produced in greater quantity in 1956 than in 1955, and three were produced in smaller quantity.

Among the groups that showed increases were, in descending order of the size of the increase: Miscellaneous chemicals (20.6%); surface-active agents (11.4%); elastomers (11.1%); plastics and resin materials (6.4%); and plasticizers (5.2%). The groups that showed decreases were, in descending order of the size of the decrease: Dyes (9.8%); toners and lakes (7.8%); and rubber-processing chemicals (5.6%).

THE FABULOUS FACTS ABOUT FABULIZED—*Fabulized, Inc, 518 South Delaware Ave, Philadelphia 47, Pa*——— This attractive two-color, 12-page, 9" x 3¾", black and turquoise fact book is designed to tell hosiery, clothing and piece goods manufacturers about the Fabulized process, its application, its profit potential, and marketing arrangements. The "Eye Dropper" Test is illustrated as convincing proof of the high degree of absorbency of Fabulized.

UTILIZATION RESEARCH TO IMPROVE AND CONTROL QUALITY OF COTTON TEXTILE PRODUCTS — *Southern Utilization Research and Development Div, P O Box 7307, New Orleans 19, La*———An informative review of current and recent research on cotton by the U S Department of Agriculture at the Southern Regional Research Laboratory in New Orleans, La, is contained in a recent paper by Mason Dupré Jr, Ralph M Persell, and Evald L Skau. Large-scale utilization research on cotton began in the United States in 1941 with the establishment of the Southern Laboratory, which is now headquarters for the Southern Utilization Research and Development Division of the Agricultural Research Service.

The cotton research program of the Southern Laboratory is geared not only to improving the general level of quality and lowering the cost of cotton products, but also to transforming cotton into entirely new chemical fibers designed to have special properties for specific uses. Progress in the development and improvement of testing methods and instruments to measure the physical properties of cotton fibers, yarns and fabrics are discussed. Through various chemical treatments, cotton fabrics have been made flame resistant; given greater resistance to weathering; or made semi-elastic through mercerization without tension. These and other improvements through chemical treatment are outlined.

The review was presented by Dr Skau before the Textile Institute at Bournemouth, England, and published in the Institute Proceedings.

TO THE EDITOR

On opening my latest copy of the "Reporter"—November 4th I was very pleased to see that the journal had celebrated its 40th birthday and in this connection, please accept our belated but nevertheless sincere congratulations on the eminent position it occupies in the spheres of technical literature.

AATCC must be proud of its official organ and it is one journal which even in these extremely busy times I always make time to read and profit from every issue.

May the "Reporter" go from strength to strength. With all good wishes.

A DAWBER
The Textile Manufacturer
31 King Street West
Manchester 3, England

—◆—◆—

In the paper recently published by the AATCC Committee on Colorfastness to Light (*1*), a detailed explanation is given of the observation that with moisture-sensitive samples, equivalent amounts of radiation produced more fading at low levels of intensity than at higher levels, the explanation being, briefly, the heating-and-drying effect of high radiation intensities. This was followed by the statement that it "undoubtedly explains the findings of Cunliffe, McLaren, the Mid-West Section. . . ."

This statement, although true, suggests that the explanation was being given for the first time. In actual fact, the identical reason was put forward by the writer three years ago, before the effect had even been observed. This was in a paper which discussed the theoretical implications of the possible causes of anomalous results in lightfastness testing (*2*) as the following quotation shows:—

> "As we have already seen, the surface of the pattern will be hotter than the surrounding air when the sun is shining and therefore the effective moisture content will be lower still. One might therefore expect that, where there is a marked difference in sensitivity to humidity between pattern and standards, the results of daylight exposures will show variations according to the atmospheric conditions. If the pattern is very much more sensitive than the standards, the results obtained for an exposure made when there was little sun would be expected to be several grades lower than one made when there was continual sunshine."

Ample proof of the prediction was given in subsequent papers (*3,4*) the latter showing the pronounced effect of north-window fading which, according to Schmitt (*5*), is at a radiation level too low to be registered by the Pyrheliometer.

(*1*) *Am Dyestuff Reptr* **46**, P861 (1957).
(*2*) *J Soc Dyers Col* **70**, 553 (1954).
(*3*) *Ibid* **72**, 527 (1956).
(*4*) *Ibid* **73**, 121 (1957).
(*5*) *Can Textile J* **74**, No. 17, 57 (Aug 23, 1957).

K McLAREN
Hexagon House,
Blackley,
Manchester

Correction

We are indebted to Paul Davis, chemist and colorist, Bluco Textile Printers, Brooklyn, NY, for calling attention to an error which appeared in Dr Edelstein's article, "A Look at the Early Dyers' Guilds", which appeared originally in *Am Dyestuff Reptr 43*, No. 4, 119-20, February 15, 1954, and also in the booklet "Historical Notes on the Wet-Processing Industry", which was mailed recently in conjunction with the "Book of Proceedings of the Perkin Centennial" to all those who had attended the Centennial.

Mr Davis states:—

"You are pointing out that two men, Andre Hermannofs and Johann Garsoff are permitted to be master dyers, according to the Meisterbrief of May 1, 1800. This is not the case. First of all, it would be absurd to grant a degree to two people on one document; second, the above-named men are identified as "Beysitzer", which in the modern way is spelled Beisitzer. Beisitzer are the men, who are sitting in with the supreme elder to testify the procedure.

"The member, to whom the Meisterbrief was to be issued, is not named. The space where the name of the new Master Dyer is to appear (after the word "Herr") is left blank and has not been filled in."